

The Iron Age

A Review of the Hardware and Metal Trades.

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RAPID TRANSIT IN NEW YORK.

The Gilbert Elevated Railway.

The elevated railroad projected by Dr. Rufus R. Gilbert, nine years ago, after much labor and disappointment, has at present a good prospect of completion. The bill incorporating the Gilbert Elevated Railway Company was passed by the legislature last winter, and a commission appointed to determine the route of the road rendered their decision on the 26th of December last. The route as thus determined begins at the upper end of the island near High Bridge—the terminus of the New York and Boston Railroad—and extends down Ninth avenue to One Hundred and Tenth street; thence to Eighth avenue, and through it to Fifty-third street; thence to Sixth avenue, and through it to Fourth street; thence through South Fifth avenue and West Broadway to Chambers street; thence to Bowling Green, and upward through Beaver, Pearl, and other streets to Second avenue, through which it will continue to and along Harlem River to the point of beginning.

While the deliberations of the commission were pending, negotiations were carried on with the New York and Boston Railway Company, who have finished the grading of the western extremity of their road to the Harlem River. The latter company having a charter permitting them to throw a bridge over the Harlem River, were in need of some means of bringing their passengers into the heart of the city, and the negotiations with the Gilbert Elevated Railway Company resulted in an arrangement in which the New York and Boston Railway Company have agreed to render assistance in the construction of the Gilbert road. The latter company have therefore at once proceeded to push their project, and have elected their directors for the current year. The decision of the commission removing the principal obstacle to the construction of the road, the company has brought together thirty persons, who, as stated by the president, have agreed to furnish the necessary funds to build the road, and work is to be at once commenced. Negotiations are pending with six or seven iron companies, and the president informs us that a contract will probably be awarded within ten days.

The railway proper is to be located immediately over the center of the streets through which it passes, and the structure is to rest upon wrought iron columns 12 inches in diameter, and placed on both sides of the way, the columns in each row being 66 feet 8 inches apart, except at the crossings. This will give four columns for each block above Fourteenth street. The columns rest in cast iron shoes set in masonry or concrete, and support the arched wrought iron trusses which span the street. The horizontal beam which constitutes the lower portion of the truss is also strengthened from below by segmental supporting arches, or equivalent devices bearing against the columns. Two lattice girders extend from truss to truss, and transverse beams rest upon the lower flanges of the girders connecting them with each other, and upon these rest the beams to which the ties are affixed. The general construction of the road is a series of bridges resting on trusses, and is, therefore, similar to that of the Albany bridge over the Hudson River, which is frequently required to support a weight of two heavy trains and two 50 ton engines at points where the interval bridged is 187 feet.

The telegraph wires are supported by devices for that purpose fixed above the arches, and the street lamps are supported by the columns; all poles and posts in the streets are thus dispensed with. The trains will be hidden from the view of horses or pedestrians by shields a foot or two in height running along both sides of the track.

The estimated cost of the road is \$700,000 per mile, exclusive of stations or rolling stock, and 25,000 tons of iron will be required per mile.

Steel rails will be employed of the ordinary T section, and trains arriving from the East or West will be run into the city directly upon the

elevated railway. For local traffic lighter cars will be used. It is proposed to have cars follow one another at intervals of five minutes on each of the two tracks, on both sides of the city. Our illustration gives a perspective view of the railway as it will appear when in operation.

The Fire Risk of Steam.

On Friday evening a meeting of the Polytechnic Branch of the American Institute was held in Hall 24, Cooper Institute, to consider the question of the danger of conflagration resulting from the presence of superheated steam in pipes, when contact with woodwork is permitted. The subject was discussed from the platform by Professor P. H. Van Der Weyde and Mr. Norman Wiard, with illustrative experiments.

Professor Van Der Weyde opened his remarks by saying that the condition of the question was at the present time the same as it had been when it was first introduced to the public. The theory of superheated steam had not been satisfactorily proven by any one, while its opposite was so firmly founded on truisms that it really needed very little argument in its support. He

overlooked by Mr. Wiard, viz.: That the banking of fires or the shutting of flues or that ash pans give rise to the generation of unburned hydro-carbonic gases and carbonic oxide, which may fill the boiler room, take fire, and so ignite the woodwork.

The professor here attached a rubber tube to the chandelier, and then to a drop light, which he ignited, continuing: "Now, if the door of the furnace is closed for a time, and then suddenly opened, there is seen within a blue flame, different from the ordinary yellow flame caused by the burning of coal or wood." This assertion he illustrated with the drop light by closing and opening the draught under the glass chimney which enclosed the flames. When the current of air was shut off the gas (carbonic oxide) was formed, and mounting rapidly upward, caused a higher and distinct flame at the top of the chimney. In connection with a furnace the damper was in the flue, and was supposed to be closed. The gas then might pour out of the open door and take fire; or if the door was closed, the fire banked and the damper open, it might burn at a great distance from the furnace in a flue.

Mr. Wiard then took the floor in support of

which needed, most of all, to be investigated at the present time—the points of temperature at which various kinds of wood would ignite.

After considerable further discussion of points not bearing directly on the subject under debate, the meeting adjourned.

Relative Value of Drilled and Punched Boiler Plates.

A committee of the American Railway Master Mechanics' Association some time ago reported to that body the result of a series of experiments that present some curious points. The tests applied to the unriveted plate were in favor of drilling, the mean of three experiments, with a plate 1½ inch. by 1-16 inch, and a ⅝ inch hole punched through the middle, gave 18,485 lbs. as breaking strain, and 17-1 tons for the unit strain on plate per square inch. Under the same conditions the drilled plate gave 17,645 lbs. as breaking strain, and 23-4 tons as unit strain. It should be stated that the strength of the drilled plate was considerably less than the entire plate, the former giving 23-4 tons as against 26-7. This shows that the assumption that, in a drilled joint, the spaces be-

strength" 54 per cent. The drilled plate gave 16,943 or 50 per cent. These results are so different from the opinions of practical men that it makes apparent the necessity of a thorough series of experiments to settle definitely the relative values of these two methods of forming rivet holes.

A Spark and Dust Arrestor for Locomotive Engines.

It is claimed that the desideratum so long sought for, namely, a practical spark and dust arrestor on locomotives, has at last been realized. The invention is merely a curved smoke stack, attached as ordinary smoke stacks are, the mouth running backward toward the center of the locomotive. Within, near the enlargement at the upper curve, is placed a wire screen at an angle of about forty-five degrees with the direction of the smoke, and the other screen is placed over the immediate outlet.

Just below the first screen a perforated steam stack is run horizontally through the smoke stack, connected with the boiler by a valve pipe under the control of the engine driver. As the refuse matter from the furnace passes through the stack, it is moistened by the fine spray ejected from the perforations, thus deadening the particles and increasing their weight.

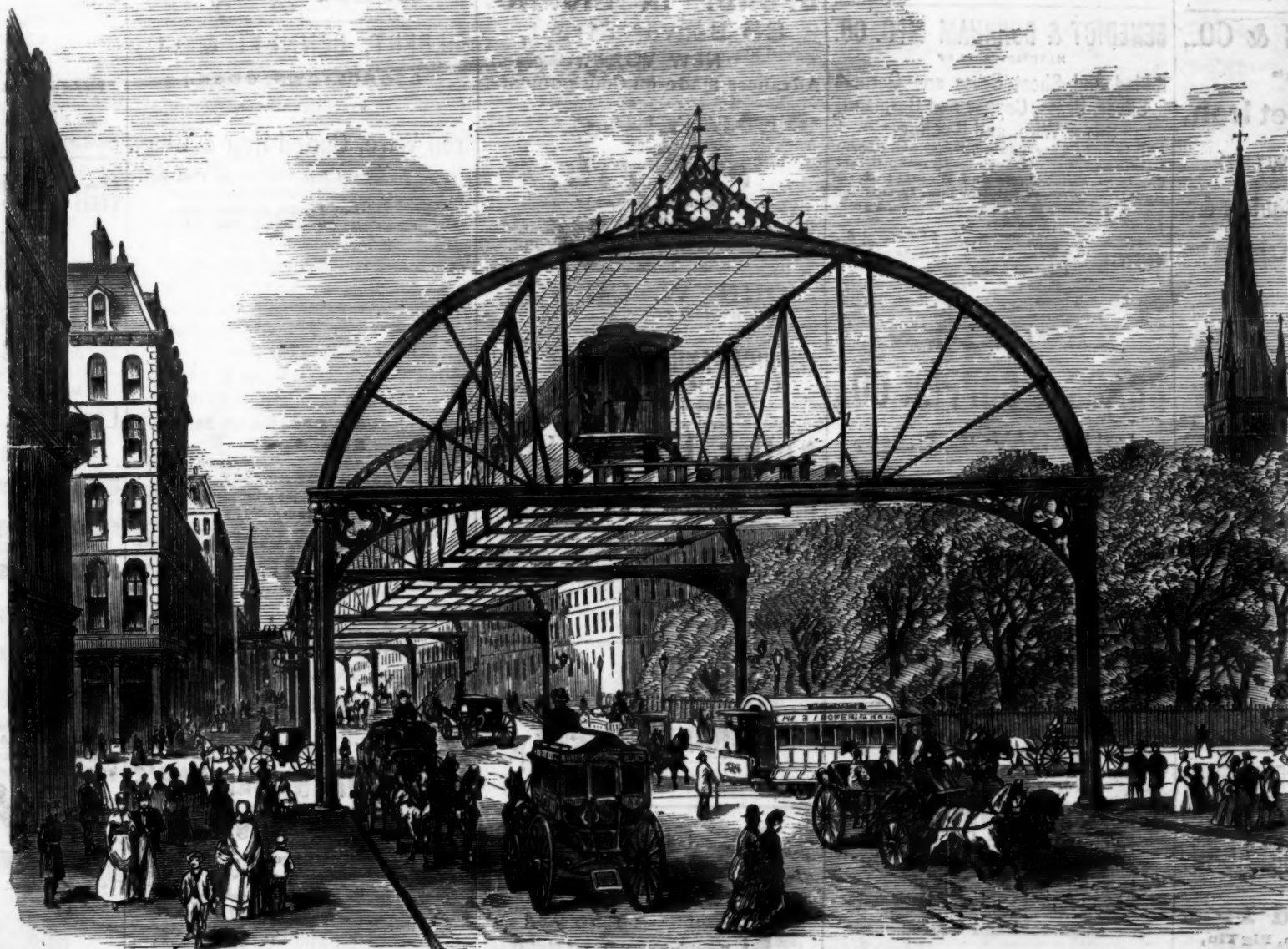
Striking at the inclined angle named above against the first screen, the particles are prevented from passing through and fall to the ground, whence, through the natural motion of the engine they are directed by a tube to beneath the boiler, and thrown upon the track in a moist and consequently harmless state.

The advantage claimed for the curved stack is not only the prevention of dust and cinders upon the train, but the avoidance of damage by fires along the track. The latter object appears to be completely attained, and that without any apparent loss of power. It was at first supposed that the draft would be so seriously checked by the new stack as to counterbalance the other advantages; but experiments show that steam is made equally as well as with the ordinary stack.—*St. Louis Railway Register.*

The *St. Louis Times* states that next to iron, lead occupies the most important place in the mineral products of that State. The lead mines now only partially developed, owing to the lack of capital, occupy a vast area of territory, and will ultimately prove a source of great prosperity to the State. In former years a large quantity of foreign pig lead was imported for use in St. Louis, the imports in 1869 having been 7857 pigs; but as the mines nearer home were developed, the consumption of the foreign article decreased, until in 1872 not a single pig was used. The receipts of lead last year were 285,769 pigs, or 22,882,050 pounds, of which Missouri produced 20,427,000 pounds. The exports from St. Louis amounted to only 4,718,233 pounds, the remainder having been retained for home consumption. The "soft brands" of Missouri lead are equal to the best imported makes for the manufacture of white lead, and are rapidly taking their place.

M. De Lesseps, having succeeded so well at Suez, has determined to cut another canal, this time across the Isthmus of Corinth. Although the proposed canal would be but five miles long, the labor expended on it would be much greater than that employed on the Suez canal, as it would have to be cut through a chain of hills, the lowest of which is more than three hundred feet above the level of the sea. The completion of the canal would obviate the necessity of the dangerous circumnavigation of the Mores.

A company has been formed with \$300,000 capital to work the Little Missouri coal mines near Clayton, Brown county. The coal is easily mined, the vein being near the surface and nearly three feet in thickness. In quality it is pronounced equal to the best Illinois coal. The company claim that they can deliver coal at Quincy at nine cents per bushel.



THE GILBERT ELEVATED RAILWAY.

referred briefly to the period when gas was first used to illuminate cities, and the great noise which was then made by alarmists in regard to the dangers by which it was attended. Now all those futile fears were obsolete and accounted silly. It was so with steam as a means of radiating heat through buildings. There was now raised a cry against it. When properly understood it would be found to be safer than any other medium. He deplored the fact that some persons were driven, by prejudice, to ascribe every fire which occurred to the heat of steam itself. The number of buildings has become immensely great throughout which the desirable temperature for comfort or other purposes is spread by means of coils of pipes, which are found on every floor, in close contact with the wood. If this were so dangerous, the whole city would have been burned up years ago! He granted that the wood might be set on fire if the pipes became charged sufficiently with dry heat to occasion a degree of temperature above that of ordinary combustion. But superheated steam, when there were no attachments to the boiler to make it dry, never did nor never could be heated so intensely as to originate flames at a distance from the furnace. In the case of the burning of the hippodrome, in Fourteenth street, there were several points

his theory, citing numerous incidents from the experience of various engineers of combustion supposed to have been caused by superheated steam. One of these had occurred on a Sound steamer, when the felting on the cylinder, 30 ft. away from the boiler, burst into flames six times during one night.

A gentleman here interrupted the speaker to relate an instance in his remembrance, where the roof of a wooden shed, in Williamsburgh, was ignited by a steam pipe in contact with it.

Fire Marshal McSpedon said that since the discussion of superheated steam had begun, an example of the truth of his theory had come in a very apropos manner under his notice. In the Harlem Gas Works the roof had been set on fire by the contiguity of the steam whistle with the wood.

Mr. Hewitt, a young engineer, said that he "ran" a boiler up town, and had kept matches in close contact with the steam tubes connected with it for days together, for the sake of experiment, and they had not yet been consumed.

Mr. Osborn, another young engineer, related incidents of the spontaneous combustion of wood, after having been charred at less than 120° of heat, and when removed from the vicinity of the fire.

The chairman stated that this was a subject

tween the holes might be regarded as yielding the full ultimate strength of the material, is erroneous.

The curious part of the experiment was that upon testing plates same size as above, riveted together with ⅝ inch rivets, the result was in favor of the punched plate. These plates tore under a pressure of 23-3 tons per square inch, the rivet sustaining the exceedingly high shearing strain of 25-6 tons per square inch, while the drilled plates sheared under a strain of 20-8 tons, the rivets enduring 23-8. This is worthy of notice. It is evident from this experiment that there is some cause that makes the rivet in a drilled hole shear more readily than in a punched hole. The committee thought this might be due to the fact that "the edges of the drilled holes are sharper and more compact, and consequently more capable of shearing than the edges left by a punch." Whatever cause may be assigned, the fact remains that in these experiments the punched joints practically sustained a greater load than the drilled ones. Another important fact ascertained was, the "proportions of strength" between the solid and punched, or drilled plate. In the punched plate, the mean breaking strain in the three experiments was 17-599 lbs., the mean in the solid plate was 32-685, making the "proportion of

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The Life of Iron Rails.

A paper was recently read before the Civil Engineers Club of the Northwest, by Mr. L. P. Morehouse, in which occur statistics of considerable interest. The information given relates to the actual wear of a number of brands of rails, each from a different maker, and therefore fairly representing the average rails of the country. He says: The road on which these rails were laid is 131 miles long; 77 per cent. of its length tangent, 21 per cent. with curves of less than 5°, and 2 per cent. with curves of over 5°. The grades are: level, 20 per cent.; less than 20 ft. per mile, 20 per cent.; and between 20 ft. and 42 ft. per mile, 60 per cent. Its yearly mileage of engines is about 1,000,000 miles. The engines used weigh 30 and 32 tons, have four driving-wheels, and carry five tons on a wheel. The speed of passenger trains in motion is 24 miles per hour, and that of freight trains 15 miles. If trains are behind time they will sometimes run at a greater speed than this.

Examination was made of seven different lots of rails which had been in use from 2½ years to five years. For convenience, I have numbered the different lots from 1 to 7, the numbers referring to the time when the rails were laid, No. 1 having been laid first and No. 7 last:

TABULAR STATEMENT OF SERVICE OF IRON RAILS.

No.	Total number of rails.	Per cent. of rails still in use		Per cent. of rails taken out.	Years in use.
		Good.	Bad.		
No. 1.....	1,087	60	18	22	5
2.....	630	66	11	23	4
3.....	3,520	43	32	25	4
4.....	1,589	25	32	43	4
5.....	1,976	46	9	45	3½
6.....	394	56	10	35	3
7.....	336	65	24	11	2½

Rails No. 1 were made under the following specification:

"The rails are to be made of iron of good quality suitable for rails, and to be subject to the inspection of an agent of the railroad company in all stages of manufacture. No old rails are to be used in the manufacture of the said rails. The piles from which the rails are rolled are to have a top and bottom piece of reheated iron not less than an inch in thickness, running the whole length of the pile. The said top and bottom are to be manufactured from puddled flats not more than ¾ of an inch in thickness."

Rails No. 2 were made from a pile 7½ inches base, 8½ inches high, made up of two flats at bottom and two flats at top, the space between these flats filled in with three pieces of old rails; the lower two flats and the top flat made from old rails, the second top flat from muck bar. Bottom flats each 1 inch thick, top flat 1½ inches, and muck bar ¾ inch thick.

Nos. 3, 4 and 5 were made at different mills under the same specification:

"The rails are to be made from a pile at least 8 inches by 8 inches, of which the head or top piece shall be composed of best No. 2—or reheated—iron, at least 2 inches in thickness, made wholly from puddled bars puddled from pig iron, in which no cinder mine has been used; in other words, the pig iron used for the head piece shall be made from good native ore alone, without any admixture whatever of cinder. The remainder of the pile shall be put together so as to break joints, with as few short pieces of iron as possible, and of such quality as will give a good, tough, fibrous flange on the base. Both the head pieces and the rail piles shall be bloomed in the usual manner, and reheated to a good soaking heat before the final rolling. All the materials and processes employed in the manufacture of these rails shall be the same as if they were to be guaranteed for seven years."

No. 6 rails were made from a pile 7½ inches base, 7½ inches high, composed of 8 layers of flats each one inch thick, except the one next below the top flat, which was ¾ of an inch thick. The top flat and the fourth from the bottom were 7½ inches wide, the others were composed of pieces 3 inches and 4½ inches wide; the different flats breaking joints. The bottom piece was from scrap iron, the top piece of reheated muck bar, and the one next below of muck bar.

The pile for No. 7 rails was composed of a base consisting of 3 pieces of old rails, 2 placed side by side and the third inverted between them; a muck bar ¾ inch thick rests on base of the inverted rail, with its ends turned down to rest on the outer pieces. Three old rails rest on this flat, arranged as in the base, and a reheated muck bar 1½ inch thick with ends turned down makes the head.

This pile received six passes, rolling it into a bloom about 6 feet long and 5½ inches by 6 inches. It was then reheated and afterward rolled into a rail.

The rails originally laid are made from a pile 7 inches base and 7½ inches high, of 6 flats, each 1½ inches thick and 7 inches wide, the one next above the bottom piece composed of short pieces 7 inches square and placed with the fiber at right angles to the direction of the pile. The top flat was made of a granular iron double-worked, the others of single-worked iron, the bottom flat being of good fibrous iron. This pile received 4 passes through box rolls at a speed of 18 inches per second, was then reheated to a welding heat and received 8 passes through draft rolls at a speed of 6 feet per second, being worked edgewise through the draft rolls.

After a service of 11 years, 33 per cent. of these rails were in good condition. The mileage for these years was, however, less than that considered for the other rails, so that 5½ years' service of the latter would be equal to 11 years service of the original rails.

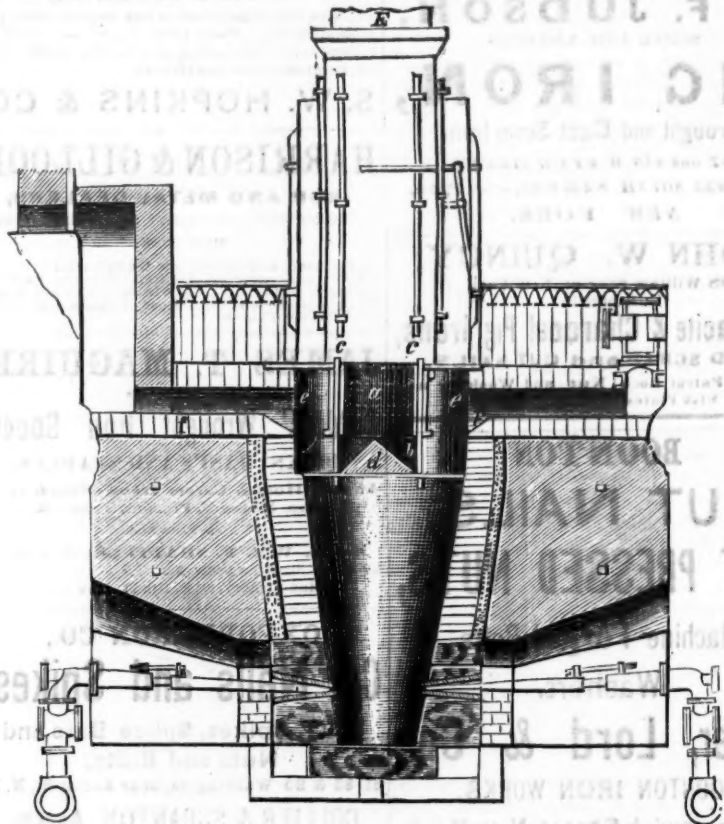
The iron foundry in East Newark, soon to be opened, will employ 200 men. Many workmen there are now out of employment.

Khern's Blast Furnace for the Use of Lignites.

The use of lignites, or brown coals, for metallurgical purposes has thus far been very limited. Like ordinary coals, they are either used directly or by employing the gases producible therefrom. The gases have been used for puddling and welding, but in the smelting of iron from its ores, lignites are yet little in use, partly because they crumble readily into fragments, and partly because their ashes sometimes exert an injurious influence.

According to Tanner, attempts have been made to use the brown coals of Inner Austria in the high furnace, but only one-eighth—at most, one-fourth—could be mixed with the charcoal charge; otherwise a considerable decrease of temperature took place. In a foundry at Bruckel, Corinthia, three charcoal charges, each of two cubic feet, are first thrown into the cupola, and afterward a brown coal charge of 30 pounds. When it was attempted to replace the third charge with lignites, the furnace of 12 feet high was too much cooled off to produce good iron. It was Tanner, we believe, who first called attention to the fact that lignites might be used, if pressure, hot blast and a large addition of lime were employed.

It is well known that the great West abounds in vast beds of lignites, which are mostly of a black color, a resinous lustre, a brown streak, and deficient of any wood structure. According to Professor Newberry, these lignites underlie not less than 50,000 square miles in the Great Basin and along the flanks of the Rocky Mountains. A great deal of this coal has been used on the locomotives of the Union Pacific and the Central Pacific Railways, where no high temperatures are necessary; yet its use for the blast furnace is now virtually given up for the reasons referred to. It is evident that any method by which these lignites could be used directly, viz., without the employment of expensive gas generators, would be of great importance, and there is good reason to regard with



KHERN'S BLAST FURNACE FOR THE USE OF LIGNITES.

satisfaction every improvement made in this direction.

The following is a translation from a late number of the *Illustrirte Gewerbezeitung* relating to this furnace: "Assuming that, in the higher zones above the belly, no alteration of the ores takes place, but that reduction and carbonization only commence in the latter, Mr. Khern accomplishes the preparation of the materials outside of the furnace, and this does away with two-thirds of its whole height. The same is only 17 feet high, or as high as the belly, the ascending gases being used in this particular apparatus to char the lignites, to roast the ores and to heat the blast. a is a cylinder for the reception of the ore and the prepared fuel; b is another cylinder which, when lifted by means of the rods, c, attached to levers, allows the charge to drop over the cone, d, into the furnace. e is a reservoir for the gases; these pass through f to the ovens for carbonizing, to the roasting furnaces and the apparatus for heating the blast, to be conveyed to the stack, E. The ovens for carbonizing are built in such a manner that the gases issuing from the furnace pass through two channels divided by a partition, above which there are, in two rows, 18 or 20 boxes, made of cast iron, of a capacity of one ton each. They are provided with covers, and serve for the reception of the fuel. The bottoms, as well as the sides, are exposed to the gases, and pipes convey the generated tar vapors into condensers. Such a blast furnace, with the other furnaces mentioned, is said to cost \$46,500, gold, and it is stated that 100 pounds of white pig iron may be produced by it for \$1.07, gold, which would make \$23.96 for the long ton of 2240 pounds.

"In conclusion, we would remark that Mr. Brunner finds the height of the furnace too low for the complete reduction and carbonization of the ore, but states that coked lignite was used in Austria in the quantity of one-third of the charge of charcoal with complete success."

The English coal masters are moving in the matter of a union among themselves as a means of protection against the miners. As it is they are almost powerless against the workmen.

The St. Joseph Bridge.

We gather the following from an article in the *St. Joseph Herald*: A company was organized and incorporated in Jan. 1871, under the name of the St. Joseph Bridge Building Co. Immediately after organizing, the company engaged Col. E. D. Mason, C. E., to make the survey and estimate the cost. Under his direction the survey was made and completed on the 4th of March the same year, finding rock bottom at the average of 45 feet; and he submitted his report, with maps and plans, recommending the present site and estimating the cost at \$715,000. On June 10th the contract for building was let to the Detroit Bridge and Iron Works, for \$710,000—the bridge to have six piers, with three fixed spans each 300 ft., a draw span 363 ft., and a shore span 80 ft. On either side of the track will be a carriage-way and a foot-way on either side of the outside of the bridge. The bridge is to be a Pratt Truss. On June 17th the contract was let for furnishing the stone. July 14th the bridge was permanently located, and in the last of the month stone commenced arriving. The first piles for the trestlework to the temporary approach from the west side were driven on Sept. 23. The framing of the caisson to pier 6 commenced Oct. 5, and the caisson was completed Nov. 5. The first masonry was laid on the 6th, and the sand pumps set at work on the 9th. Jan. 2, 1872, the pier was completed. The following are the quantities of material used in the construction of the caisson and pier: timber, 115,000 ft.; B. M.; masonry, 629 cubic ft.; concrete, 70 cubic ft. Workmen commenced setting up the caisson to pier 5 Nov. 5, 1871, and completed it Dec. 28. Feb. 2, 1872, it was landed on the bed rock. Quantities: timber, 142,000 ft.; masonry, 933 cubic yds.; concrete, 135 cubic yds. The caisson to pier 4 was commenced Jan. 6, 1872, completed Feb. 17, and landed on the bed rock March 13. Quantities: timber, 175,000 ft.; masonry, 964 cubic yds.; concrete, 134 cubic yds. The caisson to the

to this end, I would especially draw the attention of colliery proprietors and iron masters who may be under the necessity of erecting a large number of houses as substantially and cheaply as possible, the special advantages of concrete as a building material. By its use a variety of otherwise useless materials will be utilized and made to serve a valuable purpose. In large collieries or iron works there is necessarily a large quantity of such waste materials, the greater portion of which would only require to be carted away to increase the surface damages, and it is in utilizing these that concrete forms such a valuable building material. Concrete, as is well known, consists of about an eighth part of gravel, well mixed together with the proper quantity of water. But concrete can be made with other substances than gravel, as was well demonstrated at one of the largest collieries in Fife, where very superior houses were erected, by workmen totally unacquainted with the building of houses, out of furnace slag, mine or ironstone grit, rubble, and useless stones of every description, and that at a cost very much below either brick or stone, forming, when finished, the most comfortable houses belonging to the proprietors. Before commencing to build a series of experiments were made to determine the proper proportions of cement required by the various materials and the substance most suitable for building purposes.

After a protracted trial, a mixture, composed of a sixth part of cement and five-sixths part of mine dust, was found to be the best, and was accordingly adopted; but where this or gravel is not readily got, ground slag will be found to answer the purpose admirably. This important question settled, the next was to find a serviceable apparatus to build the houses; this was readily found in that employed to build the Waverly Hydropathic Establishment, at Melrose (that large building being entirely composed of concrete), and consists of a series of thick sheet iron plates, stiffened at the edges with angle iron, the plates being attached to uprights of T iron, and are kept in the proper position by pins, the plates being fixed so as to be readily raised as the building progresses. The *modus operandi* is as follows: After the requisite proportions of mine dust and cement have been mixed together, and the whole thoroughly saturated with water, the mixture is fung in between the plates, and large pieces of slag or stone bedded in it, thereafter another bed of concrete, which fills the interstices between the large pieces and thoroughly fixes them; another layer of stones or slag is then added, and so on, till the space between the plates all round the building is filled; after being allowed to stand for a night, the concrete will be hard enough to allow of the plates being lifted in the morning.

One feature in this apparatus is its extreme simplicity, so that one man acquainted with it can, in a few days, teach half-a-dozen laborers to do all that is required. Where gravel is at all accessible it is, of course, preferable by far, as it does not absorb nearly so much cement, only requiring an eighth, while the mine dust or ground slag each requires a sixth part. Although large pieces of stone or other substances are not usually employed in the building of concrete houses, still it fills up the plates much quicker, and consequently cheaper, while the building is firm enough for all purposes. The Experimental Workman's Cottages, on which my calculations are based, were built in blocks of eight rooms, forming four double-roomed houses. The dimensions of each block were 64 ft. by 25 ft. over all; each house consisting of a kitchen 10 ft. by 14½ ft., and a room 14½ ft. by 14 ft. Each block was intersected by three concrete partition walls, while each house was subdivided into room and kitchen by thin brick partitions.

In the following estimate of the cost of such houses it is taken for granted that mine dust and slag are available, but where these are not to be had parties desiring to use the estimate can add or deduct from it, as suits their particular circumstances:

ESTIMATE.		\$	¢
Wages of 6 laborers three weeks, at (say) \$7 per week.....	21	0	0
Portland cement 47 tons, at \$4.10 per ton.....	192	7	0
Ironstone dust 40 tons, at (say) \$2.50 for cartage.....	100	0	0
Bricks for partitions, &c., including cartage of same (say).....	10	0	0
Slags (in piles) 50 tons, at (say) \$2 for cartage.....	100	0	0
Laying down, and plastering outside with thin coat of cement (say).....	5	0	0
Percentage for use of apparatus (when in use only): Three weeks, at \$7.10 per month on the value—\$130.....	9	12	6
Total cost of building each block.....	287	9	3

At the same time that these houses were being built a number of brick and stone houses were also erected, of equal dimensions, and in every respect similar, when it was found that, beside much superior, these houses were immensely cheaper than either brick or stone—the lowest offer for the brick blocks being \$121, while the stone houses exceeded very considerably even that sum. For the reason that there are no seams in the building, and as the concrete is impervious to damp, while the concrete partitions delect all sound, it will be readily supposed that they make very comfortable houses, and are well worthy the attention of coal owners or iron masters.

Iron Works in Hungary.—A correspondent of *Engineering* writes as follows:

The iron works of Hungary have never been in a very flourishing state, owing to their want of mineral fuel, and the inferior quality of iron ore which they were obliged to smelt. The principal iron ores of Hungary are carbonates and brown hematites, which are raised from lodes in the Zips and Gölner counties, and do not give an average yield of above 30 per cent. In no other country would such poor ores have been smelted, but for the sake of the immense forests, of which the north of Hungary once

could boast. Instead of letting the wood rot away in the forests, the only mode of utilizing it was to make charcoal, and to produce pig iron with it which could be brought to the market. In this way some 40 charcoal blast furnaces have come into existence in the above-mentioned counties, but now that railways run through their districts, and wood has become scarce and dearer, they are in a languishing state. Beside these iron works, of which Theiszhotz, Rhonitz, and Rakos are the best situated, there are blast furnaces at Diosgyor, near Erdau, at Antalocs, Felső, Remete, and Szina, in Ungwar county, at Moyesefalu, and Szelesztó, near Nagybanja, Jakubini, in the Bukovina, Reschitz, Bogachan, and Ruskberg, in the Banat, and some others. Some of these works belong to the government, and have lately been put to sale. At Diosgyor, one mile from Miesels, are two blast furnaces, a forge, and rolling mill for rails, and large forests and coal mines, the same as at the Vajda-Hunyad iron works. However, only the latter seem to have been worked with an annual profit of some \$4000, whilst the former have never paid yet any profit at all.

A Monster Casting.—The *Mining and Scientific Press*, of San Francisco, says: At the Riedon Iron Works, in this city, the largest piece of casting ever made on this coast was perfected on New Year's day. It was a new cylinder for the Pacific Mail steamer Arizona. The cylinder in the rough weighs 43,000 pounds, requiring 25 tons of melted metal, allowing for waste, finishing, etc. It was at first supposed it would be necessary to have the casting made in the East, but the Riedon Iron Works concluded to undertake it, notwithstanding the necessity of new tools, etc., for this immense piece of work. A new pit was made and a crane of 20 tons capacity, with patterns, cones, molds, etc. When tried the cylinder will be 105½ inches in diameter inside and 13 feet 8½ inches in length. One week will be required to cool the metal and several weeks more to bore and finish the cylinder. It is expected to be in its place ready for work in the steamer in two months from the signing of the contract. The success of this casting fully demonstrates the capability of our workmen to turn out work of any description, and there is no reason why orders should be sent East for anything in this line. Hereafter, of course, such jobs will be undertaken here, and we hope to see all steamship work of every description given to our local foundries instead of sending away from home for it.

The Scotch Blast Furnaces.—A considerable number of the Scotch blast furnaces are either put out of blast entirely or damped down, owing to the want of coal and ironstone consequent upon the bitter dispute which now rages in the mining trade. The Chapelhall furnaces (Monkland Iron and Coal Company, limited), are all in blast again, but the Carnbroe furnaces are thoroughly out and are not likely to be again blown in this year. Calder, Langloan, Gartsherrie, Summerlee, and one or two other works are only able to send out a considerably reduced output of pig iron. Mr. Ferrie is progressing with his patent self-coking blast furnace. He has a third furnace on the new principle almost ready for blowing in, and the second, which is the one that was so scrutinizingly inspected by the members of the Iron and Steel Institute, on the occasion of the Glasgow meeting of that body, is giving results far beyond the most sanguine expectations of the patentee.—*Engineering*.

Senator Harlan introduced a bill recently authorizing the Secretary of War to pay to Gen. Benjamin S. Roberts fifty cents as a royalty on each breach-loading small arm that has been made by the government at the public armories, on the plan known as the Allin, Springfield or ordinance gun, since 1865. It also directs the payment of a royalty of twenty cents on each thousand metallic cartridges tapered by machinery since August 1, 1866. The condition of this payment is that Mr. Roberts shall transfer to the United States all his rights under the patents covering these inventions. The Allin or Springfield gun, which takes its name from a government employe in the Springfield Armory, was for several years the favorite of the ordinance bureau, and a stock company called the Regulation Arms Company, composed chiefly of ordinance and other officers of the army, was formed for its manufacture. The gun had little that was novel in its construction, the most important devices being taken from other guns that competed for adoption. It has now been substantially abandoned, and the ordinance bureau is attempting to select another breach-loading arm. The Secretary of War, in a report on the claims for royalty on inventions used in the Springfield market, sent to the house recently, says that 124,441 muskets have been altered on the Allin plan since the winter of 1865-6. The chief of ordinance has repeatedly called the attention of Congress to the competing claims of patentees set up against this gun. One suit is now pending, the Secretary says, in the Court of Claims; another claimant has gone to Congress, and other patentees are awaiting the decision of pending questions. The most important claim is that arising out of the suit on James B. Ely, to restrain the commanding officer at the Springfield Armory from manufacturing any Springfield muskets. The decision of the court is that one of the features of the breach-loading system adopted by the army, is an infringement on Ely's patents. A settlement with Ely's representatives, he being dead, is, Gen. Belknap thinks, required by justice. One dollar per gun is thought by the department to be an equitable amount to divide among the several claimants, and of this twenty-five cents should be paid to Ely's representatives, in addition to the cost of his suit.

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The Architectural Utility of Iron.

Methods of Building with Iron—Corrugated Iron—Painting—Fire-Proofing—Iron Churches.

IV.

Floors are frequently made by springing arches from one beam to another, the foot of the arch resting on the flange and the web constituting an abutment. The spandrels are filled in with concrete and the floor laid upon this basis. This gives a strong and fire-proof floor, but it is very heavy and expensive, and requires much furring down from the arches to form a straight ceiling for lathing and plastering. In place of brick arches, it has been proposed to use hollow segmental tiles dovetailed, forming a truss arched on the top.

Iron roofs are built of iron rafters, or with brick arches very much like floors. Great allowance, however, must be made for the thrust of the roof. A recent introduction into iron construction is iron lathing made in such a manner that the plaster keys to it. By the aid of this, perfectly fire-proof Mansard roofs may be constructed. In such roofs the rafters are of iron, on the outside of which is fixed the iron lathing to which are fastened sheets of iron. On the interior surface of the rafters is fixed the lathing to which the plaster is attached. If the slate cracks from an internal flame playing upon the roof, there remains a solid incombustible wall. The dormer windows are also made of iron. Galvanized iron cornices are also a modern invention. They are lighter than stone, and do not serve to carry a configuration like wood. They admit of greater projection than stone and require less brick support. They are also durable.

CORRUGATED IRON

has of late been introduced largely for roofing purposes. It is easily laid and the gutters in the iron leads the water rapidly from the roof. When constructed of a sufficiently thick material and galvanized or constantly painted, it makes a very good roof. The nails must be driven in the ridge of the corrugation, else the water will collect around them and rust the iron. The corrugations are from 2½ to 3 inches apart and from ¾ to 1 inch deep. The Fulton ferry-house of this city is roofed with this material. So also is the building of the Knickerbocker Ice Co. in Brooklyn, and the Flushing Railroad depot, at Hunter's Point, L. I. It is a very light and cheap material for the roofs of railway stations. As a material for general building purposes, however, it does not rank so high. It is generally made very thin, possessing no strength, and rusts with the greatest rapidity unless often painted. It is used as a weather boarding, and frequently for the sheathing of buildings. Such a structure was the Brooklyn Tabernacle, simply a huge wooden frame sheathed inside and out with corrugated iron. The city authorities have known that such buildings were not fire-proof, for they have granted no permits, save in exceptional cases, for their erection for the last four or five years. Corrugated iron came into use as a material for the construction of buildings about fifteen years ago, when it was usually supported by a light iron framework. The expense of building on this plan, however, was too great and wood was substituted for the iron framework. When heated it expands and draws its nails, or else warps. Being not over 1-16 or 1-32 of an inch thick, it does not in any way protect the wooden framework from the heat of the flames, and even promotes a draft, the space between the inner and outer sheathing acting as a flue. An illustration of the manner in which such buildings burn is had in the case of a slaughterhouse at First avenue and Forty-fifth street, in which the iron plates curled up and cracked off and the walls disappeared rapidly.

Returning to the system of iron construction, we should speak here of the immense iron doors that are now made, swinging on a pivot in the center and rolling on tracks. The rear windows of buildings are also provided with iron shutters, and rolling shutters cover the front windows. Elevators are also among the accessories of modern iron architecture.

The works in which the component parts of an iron building are made are often of a very extensive character. For example the New York Architectural Iron Works, the builders of the Grand Central Depot and the Hudson River Railroad freight depot, occupy 250 lots at the foot of East Fourteenth street, and employ some 450 men. They consumed last year about 2000 tons of cast iron and 1200 tons of wrought iron.

The various portions of an iron building are all fully prepared before leaving such a shop. The iron castings, when taken from the mold, have a rough, sandy coat, which is removed by wire brushes and scrapers, in what is known as the scratch house. Large iron cylinders, revolving on horizontal axes, also receive the castings, in which they are rotated with scrap castings for one or two hours, at the end of which the pieces are quite smoothly finished.

The round portions of the large columns are turned in a lathe and painted, and the ends are squared smoothly, so that they will stand perfectly true. The joints of iron window casings, and the iron walls between doors or windows, are also carefully fitted, so that every part may be adjusted to its place with precision. The body of the capital is cast with two or more parts, which are subsequently fastened together with small bolts. The helices and volutes are cast separately and secured by screws. Thus a very elaborate capital may be made at a moderate expense, which would cost, if cut from stone, a much greater amount. The stone capital also may be mutilated by the breaking off of some fragile volute or ornament, while such a loss could easily be repaired in the iron capital, by the casting of another ornament of the same character. Whenever practicable, the iron structure is always put up and taken down again before sending it from the shop.

This is very necessary, as it is important that all defects should be remedied there. A fault in a tie or strut might prove disastrous when the building was finally erected.

THE PAINTING OF IRON.

Iron to be used in buildings requires to be painted to preserve it from oxidation. By this means any color may be given which taste may dictate or the surroundings require. The building should be painted inside as well as out. The windows, lintels, sills, etc., must also be painted before being placed in position. The joints should receive a coat of paint before bolting or riveting. In applying ornaments, they must first be painted, the screws must be dipped in paint, and the burrs, after drilling holes in the iron, should be carefully filed away and the surface painted. Iron so treated will retain its sharpness of outline long after stone has begun to crumble and break at the edges. To paint iron costs less than the painting of wood, on account of the non-absorbent character of its surface.

When iron, however, has been painted a bright color, it has an unpleasantly glaring effect on the eye. It also magnifies, and renders palpable the defects in the metal. To avoid this, the face of the iron is often grooved with fine parallel cords, which produce a very pleasing combination of lights and shadows.

THE CONSTRUCTION OF FIRE-PROOF BUILDINGS is a subject intimately connected with the one we are at present considering, since iron has been generally regarded as a safe material in the building of fire-proof structures. Public opinion, however, has of late been unfavorable to iron in view of the many and disastrous conflagrations that have recently occurred, in which iron buildings have seemed to fall before the flames in the same manner as other structures. Such a judgment is hasty, for the subject of fire-proofing involves many considerations. A fire-proof building, in the sense in which the term is usually understood, is unknown. The N. Y. Post Office, now building, is probably as nearly fire-proof as the present condition of science can make it, but even this could not meet the popular meaning of the term. A fire-proof building, as ordinarily understood, is one which, when filled with highly combustible materials and in the midst of a general conflagration, will resist the action of the flame. This is almost impossible. When exposed to extraordinary degrees of temperature wrought iron softens, cast iron snaps, granite bursts, and brick walls warp and give way.

Iron does not readily yield to heat. It does not split or crumble like stone, and will stand a great temperature without appreciable change. A fire-proof pillar may be made of a combination of iron and plaster in the manner we have described, which is practically incombustible. The system of brick arches resting on iron beams forms a fire-proof flooring; the iron, however, should be protected from the contact of the flame. This construction adds one quarter to the cost. A system of double flooring is also advocated, the interval being filled with plaster. Double walls of brick with intervening air chambers and united at intervals with iron rods are viewed with favor. Hoistways should be protected by automatically closing trap doors, and stairways should be absolutely free from wood. All the openings of a building should be protected by iron shutters or doors. When the Appleton building was burned, some three or four years ago, the valuable warehouses on the other side of the narrow street known as Catherine Lane, were only preserved because every window facing the burning building was closed by iron shutters.

An important precaution in the building of a fire-proof structure is the complete separation of each room from the others. A letter to the Providence Journal, not long ago, describes the method of building in Italy by which the houses are rendered fire-proof. It consists in perfectly separating each room from the other by sufficiently thick partition walls and a stout ceiling. A fire originating in one room is therefore confined to that apartment, it being impossible for the flames to communicate with another. As it is, however, in our own buildings the partition walls have a thickness of 8 or 12 inches where 16 inches is required, and in many cases timbers are inserted in such walls, making them still less capable of restraining the fire. The iron lathing of which we have previously spoken also contributes to retain the fire within the room.

A very interesting subject in the discussion of iron construction is that of

IRON CHURCHES.

Iron in ecclesiastical architecture has been generally viewed from such a standard as the Brooklyn Tabernacle, which lately gave way before the flames. Much criticism has been indulged in respecting these hippodromic structures, it being charged against them that they resemble circuses. This criticism, however, only applies to such churches as the Tabernacle, which in reality was not an iron church but a wooden structure weatherboarded with this corrugated iron. Cast iron churches have been made, and may be constructed in any desired style. The capacity which iron possesses for ornament renders it especially adapted to this kind of architecture. The Architectural Iron Works have recently built a cast iron church, which they have sent to Peru in sections. With this material a very handsomely ornamented cathedral could be made, if necessary, and sent to the opposite side of the globe.

The French government, it is reported, has just purchased the secret of the composition of an absolutely indelible ink, which resists the action of every known chemical agent. This ink will accordingly not only be used on all stamped paper in the postal service and the revenue service, but in the recording of all acts of the Assembly; it will also be sold with stamps in all the small shops.

The Iron Interests of Missouri.

We take the following interesting facts and figures from an article in the St. Louis Globe:

While we notice a very large increase in the quantity of ore mined and the production of pig metal, it does not follow that the year has been a prosperous one for all the furnace owners. Some of them had sold, as far back as the fall of 1871, all their product for the year under review, at prices current at that time. Since then the prices of ore and metal have advanced very considerably, and the deliveries have been, in consequence, in many cases, made at a loss. Of the future it is impossible as yet to form any correct idea, as much will depend upon the course of iron at home and abroad. It would seem probable, with the constantly increasing demand for all the articles into which iron is molded, that the capacity of the furnaces now operating and in process of erection will be taxed to the utmost.

The following table shows the total production of charcoal and stone coal iron for the year 1872, compared with the previous year:

	1872.	1871.
Charcoal.....	44,563	35,656
Stone coal.....	82,150	49,197
.....	126,713	84,853

In the following table we give the entire production of iron ore and pig metal for the past five years in tons:

	1868.	1869.	1870.	1871.	1872.
.....	105,000	125,000	127,000	120,000	120,000
.....	125,000	125,000	125,000	125,000	125,000
.....	125,000	125,000	125,000	125,000	125,000

	1868.	1869.	1870.	1871.	1872.
.....	30,000	30,000	30,000	30,000	30,000
.....	30,000	30,000	30,000	30,000	30,000
.....	30,000	30,000	30,000	30,000	30,000

Among the various ore deposits now being worked, first in importance comes the Iron Mountain. The company engaged in working these deposits state that they have raised 310,000 tons of ore during the past year, against 169,796 in 1871. The shipments of ore by rail were 205,753 tons, against 92,517½ tons in 1871; by river, 135,721 tons; and in 1871, 92,530 tons.

The total production of iron at the Iron Mountain, Ironade, Pilot Knob, Scotia, Meramec and Moelle charcoal furnaces was 44,563 tons, an increase of 8907 tons over 1871.

Of the undeveloped mineral resources of Missouri the Globe says:

If one will travel through the State, taking the Missouri River as a northern boundary, there is hardly a county in which he can put his foot which is not known to contain extensive deposits of some one or more of these metals which are of daily use in the world of manufactures. In Jefferson county large deposits exist of hematite iron, lead and zinc ore, and of fire and ball clay. Pulaski, Dallas, Laclede, Camden, Miller, Morgan, Washington and St. Francois counties, underneath the surface, are but vast masses of the articles first mentioned. In Madison county is found in abundance specular iron, tin, manganese, copper, cobalt and plumbago, or black lead. Bollinger county is known to contain in considerable quantities kaoline, ochre, amber and sienna. In Crawford, Phelps, Dent, Shannon, Iron and Reynolds are the largest known deposits of specular iron ore in the world, as well as lead and zinc. Hickory, St. Clair, Henry, Cedar, Pope, Dade, Jasper, Newton, Barton, Bates, Cass and McDonald are each underlaid by extensive accumulations of lead and coal, with more or less iron ore. But with the hitherto sparsely settled and comparatively unknown portions of the State in which many of these counties are located, a knowledge of the locality of these deposits is, where known at all, confined to a few persons. These guard their secrets closely as possible, and in many cases, without the means necessary to deep mining, their operations have been confined to the surface. Though not generally known, a very large portion of the ore brought to this market is mined with the aid alone of a pick and shovel, the miner never going below a point from which he can throw out his product with his shovel.

Coal and Iron in Ohio.

The following statement of the production of coal and iron in Ohio is taken from the report of Gen. Sherwood, Secretary of State.

Ohio is not rich in mineral resources after the manner of Colorado or California. No valuable deposits of precious metals are known within her territory; still she has more than her full proportion of mineral wealth, the most valuable of which is her immense coal fields.

The aggregate of stone coal mined in 1871, as returned by the township assessors, is 55,316,666 bushels. The returns show that coal was mined in 37 counties in the State.

A comparative view of the amount of stone coal mined in Ohio for a series of years, as returned by township assessors, is as follows:

	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.
.....	26,887,899	30,327,294	34,230,859	45,130,021	46,703,630	55,954,392	54,955,657	47,584,792	55,316,666

The amount actually mined is doubtless largely in excess of these figures.

Sixteen counties in Ohio mined over a million bushels each during the year ending April, 1872.

The following table exhibits the mining operations of these counties in the order of product.

Counties.	No. bush. mined.
1. Stark.....	9,722,110
2. Columbiana.....	6,537,531
3. Meigs.....	5,235,545
4. Athens.....	4,391,945
5. Perry.....	3,873,095
6. Trumbull.....	3,080,804
7. Belmont.....	2,939,413
8. Guernsey.....	2,744,563
9. Jefferson.....	1,468,923
10. Summit.....	1,367,077
11. Wayne.....	1,761,150

12. Lawrence.....	1,655,909
13. Tuscarawas.....	1,550,197
14. Jackson.....	1,533,149
15. Hocking.....	1,374,863
16. Muskingum.....	1,070,880

The remaining 21 counties in which coal was mined in 1871 are: Mahoning, 648,440 bushels; Portage, 500,584 bushels; Vinton, 497,540 bushels; Harrison, 461,165 bushels; Washington, 326,419 bushels; Coshocton, 278,447 bushels; Noble, 267,498 bushels; Carroll, 184,400 bushels; Morgan, 135,773 bushels; Monroe, 67,799 bushels; Scotia, 64,871 bushels; Holmes, 54,160 bushels; Crawford, 21,937 bushels; Gallia, 12,900 bushels; Licking, 1500 bushels; Geauga, 750 bushels; Fairfield, 100 bushels; Sandusky, 90 bushels; Franklin, 80 bushels; Hardin, 50 bushels, and Lucas, 23 bushels.

Prof. Taylor, in his work on coal, estimates that, in the ordinary method of computation, at least twenty-three million tons of coal are available in the State of Ohio. The annual coal production of Great Britain is about one hundred million tons. Ohio, on estimate of Prof. Taylor, can stand the drain of Great Britain on her coal fields for two hundred and thirty years. At our present rate of consumption, on the return of 1871, we have coal sufficient to last ten thousand four and fifty years. At the expiration of that time, it is to be hoped that the Boreal gods, in their grand economy, will send us another of those great glaciers to scoop us down to the deeper hidden jewels of the earth.

IRON.

According to the Federal census of 1870 there were 216,529 tons of iron ore mined in Ohio in that year. There has been a large increase in Ohio also during the years 1871 and 1872. The Columbus and Zanesville furnaces are now using one-third native ores.

PIG IRON MANUFACTURE.

The nine counties reported are Athens, 700 tons; Columbiana, 17,646 tons; Gallia, 2760 tons; Jackson, 28,000 tons; Lawrence, 33,649 tons; Mahoning, 67,630 tons; Muskingum, 400 tons; Scotia, 9991 tons; and Tuscarawas, 5000 tons; aggregate for the State, 185,868 tons.

The amount reported in nearly every instance is too low. Muskingum county reports four hundred tons manufactured; while I have reliable information that the Ohio Iron Company, at Zanesville, made 14,000 tons. Franklin county, which is not reported, made nearly 10,000 tons; and Hocking county, not reported, at least 3005 tons; Cuyahoga county, not reported, turned out 17,000 tons.

There were ten blast furnaces built or building in 1872—at Mahoning, 3; Hanging Rock, 5; Cleveland, 1, and Columbus, 1.

Effects of Over-Taxation on Philadelphia Industries.

The effects of high taxation upon the industrial property of a locality, are once more illustrated in Philadelphia, which is mourning the loss, impending or threatened, of several extensive and important manufactures. We take the following from an apologetic article in the Philadelphia North American: "Some attention has been attracted by an announcement of the intended removal of the great iron works of Morris, Tasker & Co., better known as the Pascal Iron Works, from the district of Southwark, where they have long been located, to Newcastle, Delaware. It is indeed a matter of regret that a concern like that should be forced to remove by the narrow-minded policy that has deprived it of the railway facilities requisite for the convenient transaction of business. As the establishment employs about eight hundred hands, and supports some thousands of persons, the people of Southwark who have so toolishly resisted the grant of these railway facilities, will now feel in their real estate, their retail business, and many other ways, the withdrawal of these works. Their opposition alone has prevented the grant of these facilities, and it is fitting that they should be publicly held responsible therefor. It is a matter of surprise that the city councils of a great city should have yielded to this local clamor; and the lesson ought not to be forgotten, since the same paltry spirit is visible in the efforts to embarrass other great industrial works and cause their removal. It is probable, however, that the removal of the Pascal Iron Works is in some degree based upon the increasing burdens of taxation, which, undoubtedly, are heavy, and which the great establishments can escape by going beyond our borders.

Iron and Peat in Michigan.—Dr. C.

Rominger, State Geologist of Michigan, in his report to the Legislature, furnishes much interesting information as to deposits of peat and iron ore in that State. In the marshy meadow lands of the Peninsula an abundance of peat is stored away for future use, and is in constant process of formation. The large demand for fuel in the production of iron has already induced a company in the iron district of Marquette to make use of the peat, and as it appears, with satisfactory results. Inexhaustible quantities of iron ore are said to exist in the western tributaries of the Manistiquet and Taconamenon Rivers. Nearly all the springs contain small quantities of iron in solution, which they deposit, if by escape of carbonic acid, or by other chemical action, the solvent power of the water from the iron should fall. The waters of all the rivers of the Peninsula are freed from the iron which they hold in solution, by passing through the extended swamp from which the rivers originate, and the small continuous secretion of particles, in favorable spots, gradually increases to masses of such extent as to constitute valuable ores for the manufacture of iron. Such large deposits are, however, of rare occurrence. Usually we find the surface coated with a crust of ochraceous mud, or superficial sand is infiltrated and sometimes cemented into a hard sandstone band by the ferruginous matter, or concretionary lumps and nodules of a purer hard ore are sprinkled thinly over the ground,

and frequently adhere to the root fibers of fallen trees. Spots of this kind, noticed by the woodmen and the surveyors, have been carefully indicated in the maps, and seem to show that the whole center of the Peninsula is carpeted with bog iron ore; but the quantity of the ore here alone determines its value, and not its quality. Only in a few places the ore deposits are important enough to give favorable hopes for mining operations. One of the largest deposits of bog iron ore is found on the head waters of the Taconamenon. Here, between the head waters of Two Hearted River and the west branches of the Taconamenon, a swampy, high plateau, almost treeless, spreads out, the greater part of which is almost entirely devoid of any trace of ore. On the southeast margin, however, is a grassy marsh about 60 acres in extent, over which bog iron ore of great purity is dispersed in irregular patches. The greatest observed thickness was 15 inches, dwindling down to 3 inches, and with an average of 6 inches. Dr. Rominger is of opinion that, owing to the remoteness of these places, and the easy exhaustibility of the deposits, little present benefit can be derived from these mineral stores.

Missouri Ores.—The St. Louis Times says:

Heretofore those great deposits, such as the Pilot Knob, Shepherd Mountain and the Iron Mountain, have been the chief source of supply for the iron manufacturers, and very little attention has been paid to other ores, but the coming of the new year marks an era of development of other iron ores. Preparations are now being made to work extensively the vast beds of brown hematite and red hematite, which are to be found in large quantities on the line of the Atlantic & Pacific Railroad and Iron Mountain Railroad, and which are the most valuable at our disposal. The sooner the iron makers learn that the best marketable pig metal is made from these ores, or from a mixture of them and the Iron Mountain ore, the sooner will the metal that is produced here take the high rank it deserves. The immense quantities and diverse quality of our ores afford the iron master means of readily improving and cheapening his product, and making Missouri pig superior to any. It was until last year deemed impossible to make pig iron without using Iron Mountain ore, and so fallacious a notion has done more to retard our iron manufactures than any lack of capital or enterprise. The real wealth of our State does not consist in the Iron Mountain or Pilot Knob, but in the multitude of smaller deposits whose ores are richer, purer and cheaper, as in the case of the hydrates of iron of a decided cold short tendency. Capitalists intending to commence manufacturing enterprises will do well to consider the vast field open for investment. We have in the State a number of iron banks which have never been worked as yet, and untraversed by railroads. The great Southwest, with its ore and coal side by side, deserves attention. Our legislature should be induced to render the Meramec and Osage Rivers navigable by slack water, and give the manufacturers a cheap means of competing with railroads. With slack water navigation on these streams, iron ore could be delivered at the Carondelet furnaces for \$3 per ton, and leave the owners of the iron mines a profit from 25 to 50 per cent.

Ores for Pittsburgh.—The Pittsburgh

Commercial of the 15th inst. says:—The extraordinary advance in the price of iron ore at St. Louis and Cleveland has been the occasion for calling a meeting of iron manufacturers, to be held in this city to-day, to take into consideration the question of a supply of ores for 1873. The Iron Mountain Company have issued a circular advancing their rates nearly one hundred per cent., and there is a corresponding advance demanded for Lake Superior ores. The manufacturers regard these demands as exorbitant, and will meet for the purpose of consulting as to whether the future prospects of the trade will warrant the payment of these prices. The development of our mines of native ores will probably now engage the attention of the furnace owners, as a means to check the rapacity of the mining companies; and should this plan be determined upon, we shall not only witness the utilization of the ores now lying within our reach hereabouts, but the discovery of many new mines in all parts of the country.

L'Anse.—The Marquette Mining Journal

says: L'Anse and the North Michigami iron range is destined to be developed to an extent and with a rapidity heretofore unknown in the Lake Superior iron region. It has, to begin with, a railroad, a good harbor for shipping, and capital and energy and experience to do the work. Persons who are interested in this enterprise claim that by the expiration of three years L'Anse will be shipping as much ore as Marquette is now shipping. As a prospective fact this seems like a startling one, but it may be realized. If fact, energy, and abundant facilities will bring about this result it must come. The docks and shipping facilities at L'Anse are being completed as fast as possible, and the Michigami and Spurr Mountain Companies are preparing to make the initial shipments from that point larger than the shipments were from Marquette or Escanaba years after both of these points were established. There is truly a propitious future for that locality.

A bill has been introduced in the Massachusetts Legislature for the consolidation of the Fitchburg, Vermont and Massachusetts, and the Troy and Boston Railroad Companies, the consolidated corporation to be called "The Hoosac Tunnel Railroad Company." Including the State interests in the Hoosac Tunnel, the road will form a continuous line from Boston to Troy, with a capital of \$25,000,000.

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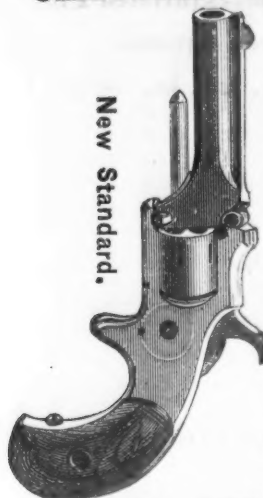
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On the Hardening, Tempering, Drawing and Welding of Steel.

FROM "DIE METALLURGIE" OF C. STOEZEL.*

CASE HARDENING

In many cases it is customary to convert only the surfaces of wrought iron articles into steel, as well as to impart to steel a greater superficial hardening than it receives throughout, so that it may wear better or be better fitted for polishing. The process by which this is accomplished is similar to the converting process, but differs essentially from it in one respect: that a carbonization, not penetrating deeply, is accomplished as rapidly as possible. Different materials are used for this purpose, such as animal coal from bones, leather, horn, etc., soot, which contains small amounts of ammonia-salts, substances containing or forming cyanogen, especially yellow prussiate of potash. Of other nitrogenous bodies used, we may mention nitre, urine or excrements of birds, which latter are distinguished for a large amount of urates.

A very common process consists in imbedding the articles in a sheet iron box in animal coal, either by themselves or with charcoal powder, and then heating them for an hour, either in a simple hearth or in a charcoal fire, and then cooling in water. Quite often the pieces are only covered with the hardening substance. By using yellow prussiate of potash, it is sufficient to heat them to a yellow red heat, to spread the finely pulverized salt upon them, and to cool in water as soon as the former is melted on the surface. If the substances are less easily fusible, it needs a binding material, such as glue-water or beer yeast, in which the tools are first immersed; the hardening powder is then spread upon them, when they are dried and heated to glowing. Rimmann, who made many experiments in case hardening, recommends a mixture of 12 parts of soot, 8 of burned horn, 10 of black flux (obtained by detonating equal parts of cream of tartar and nitre), and 23 parts of chloride of potassium. In Sheffield, Martignoni recommends 5 parts pulverized ox-hoofs, 5 Peruvian bark, 2½ salt, 2½ yellow prussiate of potash, 1½ nitre, 10 green soap. The piece to be hardened is covered with it while red hot, whereupon it is again heated to a dull redness. After this it is cooled in water, annealing being unnecessary. The expensive Peruvian bark, according to Martignoni, serves only as binding material, and might in all cases be replaced by other and cheaper materials. H. Vaughn immerses wrought iron articles into a glowing liquid bath of 25 parts prussiate of potash, 65 parts salt and 10 parts bichromate of potash, to which powdered horn or animal charcoal has been added. The articles are hardened in water. For hardening and annealing steel, he uses a bath consisting of 4 parts prussiate of potash, 12 salt and 2 bichromate of potash. For polished steel, which would be injured otherwise, he replaces the chromate of potash partly or wholly by a mixture of equal parts they use for hardening files, according to Dittmar, a mixture of 16 parts coal obtained by carbonizing waste from hoofs, horn or leather, 2 oven-soot and one part salt. From this a paste is made by the addition of some clay, water, vinegar or beer yeast. With this paste the files are covered, dried in warm air, heated to a cherry red, and hardened in a solution of salt. They are then pickled in diluted oil of vitriol, brushed and oiled, after having been dried in hot air. Eckmann says that steel obtains a very hard surface if the hardening powder intended to be used is mixed with a solution of arsenious acid in muriatic acid, as then, in glowing, a brilliant white layer of an alloy of iron and arsenic is formed, which is very little exposed to rusting.

Among the many means recommended for case-hardening, the following deserve mention: Potash and borax. Wrought iron and cast iron can be hardened, according to Johnson, if dipped for a few minutes in a heated condition into a bath of 50 parts fat, 50 oil, 35 charcoal, 25 yellow prussiate of potash, 33 horn and 30 nitre. Karmarsch mentions that the points and edges of tools (pointed hammers, etc.) may be hardened by sticking them, when bright red, for a moment into a paste of 1 part prussiate of potash, 1 part potash, 2 green soap, 2 lard or tallow, and then cooling them in water. Another recipe, which, however, was known to Agricola (1561), prescribes the dipping of the welding-hot wrought iron into molten pig iron, a few moments being sufficient to produce a cementation of the thickness of a line. A similar result may be attained by rubbing over the iron to be hardened, while white hot, with a piece of strongly heated cast iron, or by turning it in filings of gray cast iron and then by cooling it.

The process of case-hardening has not been confined to small articles, but has also been applied to large ones, such as rails, tires and parts of machines, by cementing them in specially constructed furnaces or in boxes of proper form. This operation requires from 6 to 48 hours, according to the depth to which the carbonization is to penetrate and to the cementing material applied. Recently this method has lost in importance, because most articles are now made of steel, instead of wrought iron. In consequence of a long subjugation to great heat, case-hardened articles assume a coarse, crystalline texture and then get brittle. This change, according to Carre, can be obviated entirely if the articles, when withdrawn from the cementation-boxes, are heated as quickly as possible to the highest temperature which they attained by cementation, and then allowed to cool in the air. The hardening is then accomplished in the ordinary manner.

DRAWING OF STEEL.

If steel is drawn down at a proper temperature and skillfully, a certain form corresponding to a further application may be given to it, while, at the same time, its quality can be materially improved. By hammering, the grain becomes firmer, the density increases, and, in fact, the steel attains only in consequence of these operations the highest degree of tenacity and solidity, as may readily be witnessed by the changed appearance of the fraction of unhammered and hammered steel, as well as by the considerable increase of the specific weight. The latter was, according to Schaffnahl, 7.008 when the steel was not hammered, 7.787 after hammering in the heat, and 7.87 after hammering cold. Caron has shown that, aside from these physical changes, chemical changes take place, since free carbon passes over into the combined state, and that thus a similar, only not so complete, a change takes place as in hardening. Caron analyzed three specimens of cementation-steel, of which the first had been directly withdrawn from the converting-heat, the second hammered for some time, and the third hardened. After having been treated in the same manner with muriatic acid, it was found that the residue of 100 grammes

Cementation-steel from the converting-heat consisted of... 1.634
 Cementation-steel hammered... 1.243
 Cementation-steel hardened... 0.240

These residues contained—

	Not Hammered.	Hammered.	Hardened.
Carbon	0.322	0.360	trace
Iron	0.557	0.445	trace
Silica	0.243	0.239	0.240
	1.634	1.243	0.240

Rolled steel contained a more considerable residue than that which had been hammered; the annealing resulted in this case in an action opposite to that of hammering and hardening, and yielded the more uncombined carbon the longer the heating had lasted.

As to the temperature at which steel is to be drawn down, it depends upon its chemical composition. Several brands, especially those rich in carbon, bear only a comparatively low temperature, which must only reach brown red, and which requires, therefore, much care and patience, while a higher heat can be applied for the brands approaching more the wrought iron. If the temperature falls below a certain limit, the difficulties of the drawing down become always greater, especially with thick pieces, and flaws are easily produced. For these reasons it is not only necessary to determine the temperature for every kind of steel, at which it will draw down best, but also to treat the material rapidly and uniformly. In most cases tilt-hammers are used, making 400 blows in the minute; for larger pieces, as wheel bands, heavy steam hammers or, in lieu thereof, powerful rollers and hydraulic press hammers, are employed. The latter two contrivances offer an advantage, inasmuch as they exert a more uniform pressure, communicating itself to the interior, whereas, by the short blows of a hammer the surface is more drawn down than the center, as may be easily observed at the concave form of the ends of cylindrical pieces thus treated.

Although the hammering of steel in the cold state offers particular difficulties, it is nevertheless applied for various hardened, as well as not hardened articles, because their density, hardness, tenacity and elasticity is thereby considerably increased. The hammering in the cold is, for instance, used for watch springs, annealed blue, for the edges of scythes and sickles, partly in their manufacture, partly by the resapers themselves, when they beat them out with a small hammer before sharpening; again, it is done with the edges of razors, fine chisels, etc. Articles are also hammered cold, in order to straighten them, but it is evident that in all these cases the work must be done very carefully, and that only a very gradual, and only to small distances, extending motion of the steel molecules can take place.

THE WELDING OF STEEL.

The property of weldability, as well known, is possessed by wrought iron—not, however, by pig iron; hence it is evident that steel must exhibit a very different deportment in this respect, according as it approaches in its composition the one or the other. Many kinds of steel of a low percentage of carbon weld almost as easily as wrought iron; others of a higher percentage weld with more difficulty; while, finally, pig iron, which is rich in carbon and for which the degree of softening and that of melting are near each other, can either not be welded at all, or only by particular means. Not only does the absolute amount of carbon in the steel determine weldability, but also the manner in which it is distributed through it. Crude steel and steel of cementation weld easier than cast steel which is prepared from the former by remelting, although this latter has rather undergone a diminution than an increase of the amount of carbon. Cast steel gains for the same reason in weldability, when made to glow for some time under exclusion of air and then allowed to cool slowly, whereby, as well known, a partial separation of chemically combined carbon takes place.

Steel requires a lower welding heat than wrought iron, but if exposed to too high a temperature it burns, and, in consequence, becomes so friable that it breaks to pieces when hammered. This circumstance is to be taken into consideration in welding steel and wrought iron, which is so often done with tools, anvils, rails, etc. This operation is partly executed in order to produce the articles cheaper, partly to give to the parts most exposed to wear the hardness of steel, and to others the tenacity and inflexibility of wrought iron. In this case the wrought iron is first placed into the fire, or both are heated separately, beside, particular fluxes are applied for the purpose of protecting the steel from burning and to facilitate the unification of the various materials. The most essential conditions to be fulfilled in welding is, that the pieces to be welded possess a pure metallic surface, and that they be properly formed in the first instance, so that they may be united without delay. Where it can be

done, they are put together as well as possible before they are placed in the fire. The steel must be heated as rapidly as possible and excluded from the air, best with charcoal and good coke, since coals, on account of the fact that they contain sulphur, produce a thin layer of sulphate of iron, which prevents proper welding. In order that the parts to be welded may remain pure in the fire, they are covered with a proper material, which forms a liquid, protective layer, and, at the same time, dissolves the oxide. For this purpose sand or clay is used, by spreading them upon the parts in form of a paste; the operation succeeds much surer and easier with less fusible coverings. For cast steel, ground glass, heavy spar or anhydrous molten borax serve well. Hustig says that for English cast steel common builders' mortar may be used, or, in lieu thereof, a mixture of clay and sand.

Aside from these simple means, special welding powders are employed, the composition of which permits the formation of an easily fusible slag, which at the same time acts as a carbonizing material. Among the mixtures recommended we mention the following: 64 parts borax, 30 parts sal-ammoniac, 10 parts yellow prussiate of potash, 5 colophony. These ingredients are heated with ½ litre water and some alcohol, until dry. But, since during boiling, borax and sal-ammoniac are converted into boracic acid and common salt, and since the colophony gives formation to a carbonaceous layer, rather preventing the welding, Th. Rust recommends 41.5 parts boracic acid, 3.5 salt, 15.5 prussiate of potash, 8 calcined soda.

Habich prescribes 7 anhydrous prussiate of potash, 3 calcined soda, and more or less burned borax, according to the nature of the steel. Ermer recommends, to dissolve in water, 8 borax, 1 sal-ammoniac, 1 yellow prussiate of potash, and to evaporate the solution at a low heat to dryness. When strongly heated, violent explosions may occur by the formation of chloride of nitrogen. Another method is as follows: Borax is fused with 1-10th of its weight sal-ammoniac, and to the vitreous mass same quantity of burned lime is added. Still the another employs 8 parts heavy spar, 1 gall of glass, and 1 black oxide of manganese.

In welding, at first, light, then heavy blows are given, so that the slag may escape from the joints, whereupon the outer surfaces are united. Instead of ordinary hammers, rollers or hydraulic presses are sometimes used. It may finally be mentioned that the coating of large wrought iron articles with steel is also accomplished by casting steel around them in proper forms.

The Dormoy Rabble in Scotland.

Experiments made in this country with the Dormoy rotary rabble have not been attended with results altogether satisfactory, but in Great Britain, as well as on the Continent of Europe, it seems to be held in high esteem. We take the following from the London Mining Journal:

At the North British Ironworks, Coatbridge, which were built about four years ago, by Mr. Thomas Ellis, there are several features worthy of notice. Mr. Ellis is himself the inventor of a new modification of the ordinary puddling furnace used at his works, and he has been the first to undertake the development in Scotland of M. Dormoy's patent revolving rabble. The two puddling furnaces erected on Dormoy's plan have so far proved highly successful, although, as they have only been about three months in operation, their full merits have not yet been ascertained. Apart from the relief gained to the puddler by the use of a revolving rabble, the system is also credited with the following advantages:

1. A great improvement in the quality of the iron produced.
2. A great diminution in the number of ruinous "cobblers," or "wasters."
3. The capability of working up very gray, or also inferior kinds of pig, without using any "fined metal."
4. A diminution of loss in mill scale between the rolls.

Briefly stated, Dormoy's patent consists of a common belt, driven from shafting about 6 ft. above the furnace, which rotates the shieve, loosely jointed at one end to the puddling rabble, and at the other turning on a pin, held in the hands of the puddler. The rabble works at from 700 to 800 revolutions per minute for white pig, and 800 to 1000 for gray metal. We understand that Mr. Ellis is so satisfied with the results of the revolving rabble, and has so recommended its merits to others, that it is in contemplation to attach it to other furnaces in the Coatbridge district. Workmen are apt to grumble at innovations, and puddlers are said to be particularly unreasonable in this respect, but there can only be one opinion as to the relief which the use of a rabble affords to the hardest labor voluntarily undertaken by man—that of hand puddling; and on this ground alone we should expect to see its application more general.

It has been a long time the practice with horologists to use graphite as a reducer of friction in even the most delicate pieces of mechanism. In blowing engines—if the gearing is copper—graphite is the only lubrication used. These facts have led to the simple experiment of ascertaining the effect of a mixture of graphite prepared by decantation and hog's lard, first in the stuffing box of a pumping engine, and subsequently upon a steam engine. The result proved to be very satisfactory in this case, the only especial care requisite being to keep up the necessary quantity of graphite in the mixture, as otherwise it becomes too fluid. In another experiment, in which a paste of graphite and water was employed, the result proved equally effective; the slight escape of steam into the stuffing box was sufficient to keep the graphite in a moist condition, and the lubrication seemed quite perfect, although there was no fatty matter present.

* Translated for The Iron Age, by Dr. Adolph Ott.

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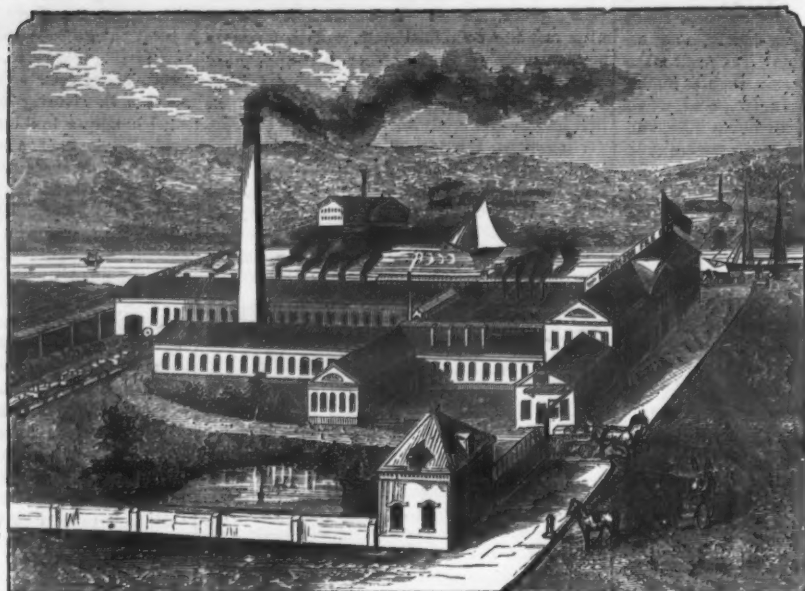
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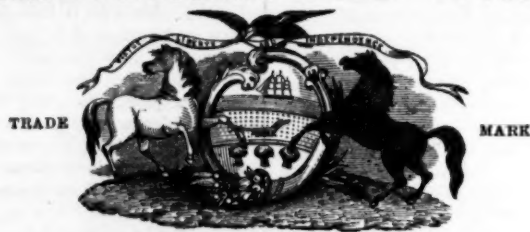
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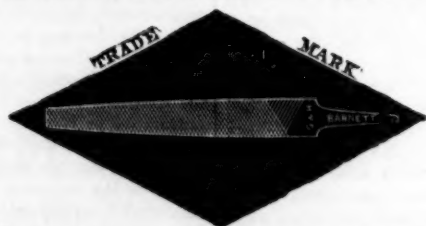
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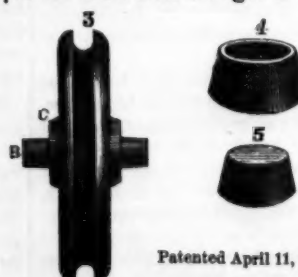
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Fig. 1—Shows Hanger with the Projection (A) corresponding with the Brace (B) of the Rail.
Fig. 2—Shows the Rail with Double Brace (D) and E.
Fig. 3—Shows Sheave with Cast Axle (B) and Shoulder (C).
Figs. 4 and 5—Show chills used to chill the Axle (B) and its bearings.

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Vulcan Horse Nail Co.

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We carry a full stock of the SUPERIOR ENAMELED WARE, manufactured by Albion, Hart's
Wiley & Co. Also, Hood's Patent Soapstone Sled and Polishing Irons.

Barnes & Deltz.

Joe. Dixon Crucible Co.

Moran & Sons.

Reading Hardware Works

Tuttle & Hotchkiss.

G. H. Coe.

Langstroth & Crane.

William McNiece

Klein, Logan & Co.

Arcade File Works.

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THE "WASHOE" TOOL MFG. CO.,

SOLE MANUFACTURERS OF THE



Celebrated "Washoe" Rail Road and Mining Picks,

Including all other adze eye tools. First premium was awarded by the American Institute Fair in 1868, to this Company.



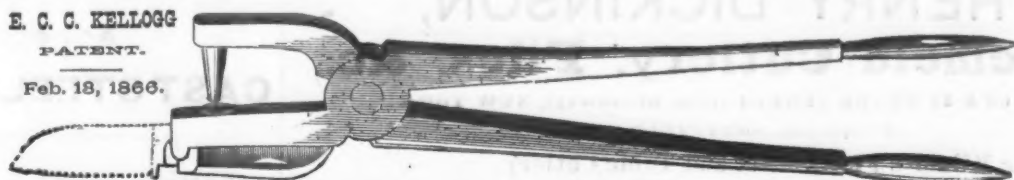
Have constantly on hand a large supply of COAL, RAIL ROAD AND CALIFORNIA OR MINERS' PICKS. We claim that OUR PRICES ARE LOWER than our picks are SUPERIOR to any thing in this country. Liberal discount to large dealers. Send for price list. Post Office Box 3170.

New York Office, 61 and 63 Park Place and 5 College Place.
H. H. TRENOR, Treasurer.

E. C. C. KELLOGG

PATENT.

Feb. 18, 1866.



COMBINATION BELT PUNCH,

Pronounced by those who have used them the handiest and most desirable tool in use of its kind. As will be seen, the combination consists of

Belt Punch, Knife and Awl,

Also, Needle for Lacing Rubber Belting, so combined that each tool does its specific work and not interfere with either of the others.

E. C. C. KELLOGG & CO., Hartford, Conn.

For Sale by Hardware Dealers generally.

NELSON TOOL WORKS,
Trade Mark. H. NELSON. 157 East 32d Street, N. Y., Trade Mark. H. NELSON.

MANUFACTURERS OF:
Shackel Bars, Block Stone Sledges, Mauls, Sledges, Blacksmiths' Sledges, Masons' Brick Hammers, Swedges, all sizes, Mill Picks, Crow Bars, Smiths' Hand Hammers, Coopers' Hammers, Masons' Stone Axes, File Cutters' Hammers, Striking Hammers, Fullers, all sizes, Horse Shoers' Tools, Rail Tongues.

Mining & Paving Tools, H. Nelson's Solid Eyed Pick, Kip Hammers, Stone Breakers, Masons' Peen & Scabbling Hammers, Hand or Mash Hammers, Chipping Hammers, Flizzers' Hammers.

HAMMERS of all kinds made to order, on receipt of Pattern or Drawing. Special attention paid to R. R. Work.



Biddle Manufacturing Co., FINE TOOLS AND Hardware Specialties.

We call the attention of Carriage Makers, Machinists, Iron Railing Manufacturers, Blacksmiths, and all others interested in Drilling, Punching or Cutting Iron, to our

Improved Drill Press, Shear & Punch,

feeling assured that upon examination their merits must be apparent to every one, from the fact that they possess the essential characteristics of strength, power and cheapness, in a high degree.

Illustrated Catalogues and Price Lists furnished on application.

We are also prepared to furnish light work of any description and in any quantity to order.

All kinds of Die Forgings promptly attended to.

OFFICE & WAREHOUSES, 78 Chambers Street, New York.

ALFRED FIELD & CO., VAN WART, SON & CO. Foreign Hardware Commission Merchants.

PRINCIPAL OFFICES,

Birmingham, England, Nos. 66 & 67 Parade.

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BIRMINGHAM, - ENGLAND.
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VAN WART & McCOY,

43 Chambers Street, New York.

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for the

John Himmer & Son's Celebrated

Harness and other Needles.

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Industry Manuf'g Co., Railway, Blacksmiths' and Miners' Tools,

Railroad and Coal Picks, Crow Bars, Mauls, Tamping Bars and Picks, Rail Tongues, Sledges, Hand, Stone and Striking Hammers, Smiths' Tongs Gas Pipe Tongs, Telegraph Pole Bars, Cold Chisels, Wedges, Froes, Cast Steel Drills, and

MINERS' TOOLS of all descriptions.

ALSO,

SALT MANUFACTURERS' TOOLS,

Bittering Pans, Ladders, Kettles, &c.

Prices furnished on application.

Chain and Pulley for Heavy Sash
F. & L. MANTY & MARSHALL,
48 Warren Street, NEW YORK.
Manufacturers of every description of
BUILDERS' HARDWARE,
Pure Bronzed Metal and Hand-Plated Knobs, Hinges, &c.,
For First-Class Dwellings and Public Buildings.
Agency and Depot of the TRENTON LOCK COMPANY.

CHAS. BROMBACHER,
Tarrytown N. Y.

MANUFACTURER OF
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PAPER BOX MAKERS' DO.,
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GENERAL
HARDWARE MERCHANTS,
BIRMINGHAM, ENG.

Agents and Sample Rooms.
New York—Edward Frith, 16 Cliff Street.
Boston—H. L. Richards, 18 Batterymarch Street.
New Orleans—R. Rhodes, 71 Camp Street.
Montreal—J. J. Evans 14 St., John Street.

BUSINESS ITEMS.

NEW YORK.

The Maxim Gas Machine Company, capital \$300,000, organized in 1868, manufactory at Paterson, N. J., have perfected the machine, and established a branch company on the Pacific coast, with a capital of \$250,000, which has furnished several towns in California with them. These machines are made in various sizes, of from 30 to any number of lights required. The gas is made from gasoline, by the application of heat.

Mining operations have again commenced at the Erie Lead Mine at Guymard. The ore is now worked for zinc alone, in which it is very rich.

The Continental Iron Works, Greenpoint, T. F. Rowland, proprietor, are now making extensive additions and alterations. A new building, two stories high, has been erected, of which the dimensions are 100 by 50 feet, and an addition has been made to the foundry 100 by 75 feet. These works employ 600 men, in the erection of gas works, building of iron vessels, and the manufacture of specialties, such as steam yachts, &c.

PENNSYLVANIA.

The Lebanon Manufacturing Company's works were burned on the 7th inst. The loss is \$75,000; insured.

The greater portion of the territory containing the iron ore recently discovered near Freeburg, Snyder county, has been leased by the Messrs. Crulshanks, who will erect blast furnaces at an early day.

The Jackson Iron Company, of Sharon, will hereafter be known as the Stewart Iron Company, in honor of the president.

Messrs. Jackson & Jacobs have leased the rolling mill part of the old Snowden foundry and machine shops, in Brownsville, and will soon commence the manufacture of iron. They expect to employ 40 or 50 men, and will turn out from 8 to 10 tons of iron per day.

The Lehigh Coal and Navigation Company are taking into consideration the erection of extensive machine shops, and, if they build, it is thought Mauch Chunk will be the place selected for them.

The repairs to the North Penn Furnace, Bingen, are nearly all made. The stack has been built 30 feet higher and cased with iron.

The Mount Laurel furnace is being converted into an anthracite furnace. When this furnace was first erected, 25 years ago, the stack was built so as to be able to adapt it at any time to the purpose of an anthracite furnace, and three layers of the proper size were constructed. The stack has been run up to a height of 50 feet. The furnace will be 11 feet in size in the boshes, and will have a capacity of from 100 to 125 tons of iron per week.

The Pittsburgh Forge and Iron Co.'s mills, which have been stopped since Christmas for necessary repairs, commenced operations Monday, 6th inst., double turn. Their steam forge, owing to pressure of orders for car axles and forgings, only stopped for Christmas and New Year's days.

The Commercial Colliery, at New Philadelphia, operated by the Philadelphia and Reading Coal and Iron Company, was burned on the 6th inst. Loss, \$50,000; insured.

Shoenberger & Co., Pittsburgh, intend to build 100 coke ovens in the spring on their coal land near Latrobe, on the Pennsylvania Railroad.

Thirty thousand dollars has been subscribed toward a new blast furnace, to be erected in the vicinity of Bath.

Lewis, Oliver & Phillips, Pittsburgh, have purchased, at Beatty's Station, on the Pennsylvania Railroad, several tracts of coal land, which aggregate 1200 acres.

Glendon, in the Lehigh Valley, is soon to have a new blast furnace.

The Harrisburg Telegraph claims that the Baldwin Steel Works in that city has more than once beaten the big day's work of the steel works of the Cambria Iron Company, at Johnstown. It says: On December 12th, 1870, the Baldwin works made 16 heats in 12 hours, and on February 6th, 1871, they got out 18 heats in 12 hours, producing 195,744 pounds of rail steel. In October last they made 17 heats in 11 hours, producing 194,391 pounds of steel—this on the 16th, while on the 21st they accomplished the incredible feat of making 33 heats in 23 hours, thereby producing 363,406 pounds of steel. On several other occasions have 16 heats been made in 12 hours or less.

An iron furnace is soon to be built at McVeytown.

The engines of the steamship Pennsylvania are finished, and Messrs. William Cramp & Sons commenced to place them in the steamer on the 2d inst.

Messrs. James Wood & Co., have recently sold their nut, bolt and tube works in South Pittsburgh to a new firm, of which Messrs. Nimick & Co. and Lewis, Oliver & Phillips are prominent members. The new company took possession the 1st of January, 1873, and will shortly commence operations.

MASSACHUSETTS.

The Dighton Furnace Company, of North Dighton, in addition to their "Webster hot-air furnace," make a great variety of cooking and parlor stoves, ranges, all kinds of wrought iron pipe, etc. Their annual sales amount to about \$300,000.

The Sheffield Manufacturing Company have completed their new foundry buildings, and commenced operations with a partial force.

A stock company will soon be formed at Shelburne Falls to manufacture the new locks invented by Major Henry Winn.

Pevy Bros., Lowell, manufacture machinery castings, furnace grates, window weights, etc. They employ 40 hands.

Messrs. Fearing, Rodman & Swift's Standard Chain Works, East Bridgewater, manufacture chain cables of all descriptions. They are now

making from 15 to 30 tons per week, from 1/4 inch to 2 inch iron. About 25 hands are employed.

The American Bolt Company, Lowell, employ 100 hands and turn out 40,000 bolts per day. The machine which "puts a head on" the bolts is said to be one of the best ever invented. They also run 12 presses on nuts, washers and chain links.

Buck Bros., Milbury, have recently added a new grinding and polishing shop to their works. It is light and roomy, and will greatly conduce to the health and comfort of their workmen—their chief motive in constructing it. They have room for 10 grinders and as many polishers.

CONNECTICUT.

The Thomaston Clock Works have just sent to Ohio a clock 6 ft. high, 6 ft. wide and 4 ft. deep, costing \$2900. The pendulum is 14 ft. long, and the pendulum ball weighs 300 pounds. The weights weigh over 1000 pounds each. The works are to be set in the lower story of the building, while the hands and dial are placed in a high tower. The gas that illuminates the dial will be turned on and off by the motion of the clock.

VERMONT.

The building known as the Iron and Steel Works, at St. Albans, is enclosed, and gangs of men are busy placing within the machinery as fast as the weather will permit.

OHIO.

The new stock house of the Franklin Iron Company, Columbus, erected on the site of the one which tumbled down on the 27th of October, is ready to receive the roof.

The blast furnace of Wm. Ward, Niles, which had been in operation since November 11, 1870, blew out with the close of the old year, for repairs, which will be made forthwith.

The new furnace at Stony Hollow has started successfully.

Columbus has a new rail-mill, which proves to be a good manufacturing investment.

The American Wrench Manufacturing Company, Cleveland, are doing a prosperous business. They make several styles of wrenches of different sizes, all of which combine simplicity, strength, and utility. They are much stronger than the ordinary wrench, and can be furnished at much less cost.

The Stark Manufacturing Company has lately been formed at Alliance, and the works are now in operation. The concern is incorporated and commences business on a substantial basis. The company are making machinists' tools, embracing lathes, planers, drills, gear cutters, &c. Their location gives them special advantages in the way of shipping and coal supplies.

The new enterprise, at Columbus, the Sterling Car Wheel Foundry, is meeting with good success.

KANSAS.

The King Iron Bridge Manufactory and Iron Works of Iola, finding their orders increasing beyond their capacity to manufacture, and also that the facilities for transportation at Iola were inadequate, reorganized the past summer by incorporating the King Bridge Company, of Topeka, and immediately commenced the construction of shops on a grand scale. The foundry is 76x146 feet, is 23 feet high in the clear, contains two cupolas with stack 80 feet high, and will run twelve tons of iron per day. Adjoining this on the north is the machine shop, 80x158 feet and two stories high, the second story to be used for a pattern shop. The lower story will contain two steam engines of forty horse-power each. Immediately beyond this is the blacksmith shop, of same size as foundry; while, off the machine shop, to the east, giving the whole building the shape of the letter T, is the arch shop, 125x300 feet, through which crosses a railroad track, running over two of Fairbank's scales, of the capacity of 35 tons each. This shop will contain all the machinery for completing the bridges, including heavy shears, punches, etc. It is proposed to build the King Patent Bridge, used for highways only, which is made entirely of iron; the Pratt Truss bridge (iron) for highways and railroads; the Howe Truss Combination, which is of wood and iron, all the members that bear strains of compression being of wood, while those that bear strains of tension are made of iron; and, in short, any required pattern, beside iron piers, both cast and wrought, and all kinds of heavy castings generally.

MISSOURI.

Preston & Co., a Missouri iron firm, have purchased about eight hundred acres of coal lands on the line of the Latrobe and Ligonier Railroad, and will begin the manufacture of coke as soon as the road is ready for carrying freight. Frank Cowan's Paper says the firm will probably erect iron works on their territory.

NEW JERSEY.

The discoveries of iron near Schooley's Mountain are being utilized by enterprising iron dealers, who have recently made extensive purchases of land in the vicinity.

GEORGIA.

Very rich iron ore has been discovered at Dalton.

MICHIGAN.

The Bangor Furnace Company, Van Buren county, have commenced casting pig iron—25 tons a day.

The Cascade Iron Company has one of the finest and largest charcoal furnaces in the world, located at Pittsburgh, a new settlement two miles north of Escanaba. The mason work is of Milwaukee brick and the stack of iron. This company is composed of Pittsburgh, Pa., gentlemen, and has, in connection with the furnace, from 5000 to 6000 acres of hard wood timber lands, and is building a large number of charcoal kilns of the latest designs.

The entire product of the lead mines in Wisconsin, since they were first opened, is estimated at nearly \$300,000,000.

Saws.

H. W. PEACE,

MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

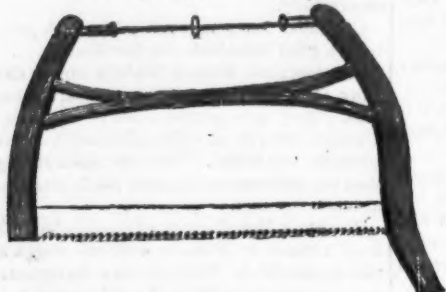
AMERICAN SAW CO.



Also, SOLID SAWS OF ALL KINDS.
Factory, Trenton N. J. Office, No. 1 Ferry St., cor. Gold St. N. Y.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



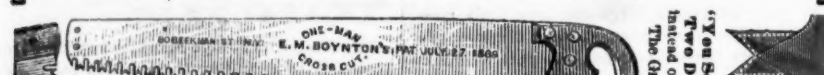
The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y.

BOYNTON'S LIGHTNING SAWS.

Front Edge View showing two points of M tooth dressed to cut in line on one side, and two on the other.



The Lightning One Man Cross-Cut, for Cutting Wood, Joists, Logs and Timber, and Sawing Down Trees.

The Lightning Saw has been awarded the American Institute Medal, 1872.

The superiority of the Lightning Saw over all others is now established beyond dispute. No man has ventured to put his saws in competition with them at the American Institute or elsewhere; and the challenge of \$500 for a public trial has never been accepted. Wherever power and speed are wanted—wherever time and strength are too valuable to be wasted, there these Saws will assert their claim. One source of their power is that the teeth are formed to cut both ways, and each tooth having two direct cutting edges instead of one scraping point, it plows a clean groove through the wood, while the other teeth only crush their way through under hard pressure.

Facts and opinions given by gentlemen of the highest character, from their own observation and experience, fully sustain all that can be said in praise of this invention. J. W. BLAKE, Esq., Superintendent of the American Institute, writes: "For all purposes of cross cutting large or small timber, your cross cuts and wood saws have no rival in speed or ease. Their universal use would save a vast amount of money and time, and lighten the labor of millions of men."

At the Bedford Farmers' Club, at Katonah, January 26, 1872, a leading farmer of Westchester county said that he had used the Lightning Cross-Cut Saw the last year, and that two men could cut more wood with it in one day, than in three with any other saw. A practical lumber man also writes: "It is as easy to cut 20 to 25 thousand feet with the Lightning saw as 8 to 10 thousand with the old V tooth. We get 80 cents per thousand for cutting—so the difference would pay for a saw in less than one day's work."

The Lightning Saws are now in use and for sale in every State and Territory of the Union, and are sent to foreign lands; indeed to every quarter of the world. More than 100,000 purchasers during the year 1872 add their testimony to the claims of superiority of the Lightning Saws. These Saws are of all sizes, from the fine hand-saw of one foot long, to the ten-foot California Cross-Cut. Two men can use the one-man saw, by attaching one of Boynton's Patent Handles, removable at pleasure. Many imitations are abroad that are deficient in some essential features, and I am prosecuting infringers in the United States Courts. None are genuine unless they bear the name of E. M. BOYNTON, and the date of the four patents. Every such saw has been rigidly inspected before leaving the factory, and is warranted to cut to touch ends without injury. A six-foot Cross-cut and a Buck-saw blade will be sent for Six Dollars. For Catalogue, Price List and additional information, please address

E. M. BOYNTON,

Sole Proprietor and Manufacturer, 80 Beekman St., New York.

FRONT VIEW. BACK VIEW

LLOYD, SUPPLEE & WALTON,
WHOLESALE
HARDWARE HOUSE,
AND
HARDWARE FACTORS.

BATES' MANUFACTURING CO.'S GOODS.

Bonney's Pat. Hollow Augers & Spoke Trimmers.
Bonney's Patent Double-Edged Spoke Shave.
Bonney's Patent Adjustable Gate Hinge.
Bonney's Patent Sash-Fast and Lamp Bracket.

625 Market Street,
PHILADELPHIA.

Cutlery.

Landers, Frary & Clark,

53 Chambers and 31 Reade Streets, New York,

MANUFACTURERS OF

TABLE CUTLERY

OF EVERY DESCRIPTION. ALSO.

General Hardware,

IN VERY GREAT VARIETY.

53 CHAMBERS ST., N. Y.

HENRY DICKINSON,

Sheffield Cutlery, Files, &c.,

66 & 68 READE STREET (near Broadway), NEW YORK.

Manufacture, SHEFFIELD, ENGLAND.

Isaac Milner's Fine Pocket and Table Cutlery.

Howard Bro.'s Medium Pocket Cutlery.

J. B. Osberton & Co.'s Medium Table Cutlery.

Isaac Milner's Razors, Butcher and Hunting Knives.

Hargreaves, Smith & Co.'s "Imperial" Files.

Milner's "A" and Collins' "IXL" Hand Saws.

Notice of Removal.

ASLINE WARD,

From 54 Beekman St. to No. 101 and 103 Duane St., N. Y.

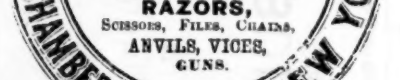
REPRESENTING

GEO. WOSTENHOLM & SON

CUTLERY AND RAZORS,
WASHINGTON WORKS, SHEFFIELD.
CORPORATE MARK.FRED'K WARD & CO., SHEFFIELD,
CUTLERY & TABLE KNIVES.
CORPORATE MARK.H & J. W. KING
ENGLISH
HARDWARE.
WOSTENHOLM'S
(IXL)
POCKET KNIVES,
KNIVES & FORKS,
SCISSORS, FILES, CHAINS,
ANVILS, VICES,
GUNS.

80 CHAMBERS ST., NEW YORK

CORPORATE MARK.



Joseph Rodgers & Sons'

(LIMITED)
CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
CHARLES PEACE, Jr., Agent.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA,
AGENT FOR

George Wostenholm & Son,

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

SOLE AGENT FOR THE UNITED STATES OF

WALTER SPENCER & CO.,

Steel and File Manufacturers,
Rotherham, ENGLAND.

Corporate Mark.
N^o SPENCER
ROTHERHAM
Granted 1777.

RICHARD A. TURNOR,

37 Chambers St., New York,
Agent for

F. W. HARROLD,

Hardware Commission Merchant,
BIRMINGHAM.

JOSEPH ELLIOT & SONS,

Manufacturers of Razors, Table Knives, &c.,
SHEFFIELD.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.
THOS J. BRADLEY, President.

The Miller Bros. Cutlery Company,

Manufacturers of Patent

FINE PEN AND POCKET CUTLERY,

WEST MERIDEN, CONN.

We warrant our Knives equal in cutting qualities and workmanship to any made. We also make

SILVER PLATED POCKET KNIVES, which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other Knife.

CLARK, WILSON & CO., Agents,
81 Beekman Street NEW YORK.

H. CARTER & SON,

290 PEARL ST., NEW YORK.



Moulders' and Plasterers' Tools.

Manufacturers of and dealers in all descriptions of Moulders' and Plasterers' Tools, and dealers in

General Hardware, Glided Copper Weather Vanes,

CARTER'S PATENT CARRIAGE LIFTING JACK, &c

Ornamental Wood Co.

Bridgeport, Conn.

Cabinet Ornaments and Trimmings

OF

Natural Woods,

in great variety of form,

Door Knobs, Escutcheons, Shutter Knobs,

Panel and Tablet Ornaments,

Drawer Pulls, Medallions, Rosettes,

LION HEADS, JEWEL BOXES, SLEEVE

BUTTONS, etc., etc.

A new Illustrated Catalogue and Price List will soon be out for 1873, containing many new designs useful to the trade. This Company has no offices other than at factory, Bridgeport, Conn., and No. 5 West street, London, England.

Saws.

WHEELER, MADDEN

&

CLEMSON

Manufacturers of Warranted Cast Steel

S A W S

OF EVERY DESCRIPTION,

including

Circular, Shingle, Cross Cut,

Mill, Hand, Roberts' and

other Wood Saws,

&c., &c.

CAST STEEL FILES

of the well-known brand of

WHEELER, MADDEN & CLEMSON.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

97 Chambers Street, New York.

Brundage Forged Horse Nails,

Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

Wheeler Madden & Clemson,

MIDDELTOWN, ORANGE CO., N. Y.

LIVINGSTON'S

PATENT BRACED

WOOD SAWS,

Pat. BUTCHER & KITCHEN SAWS

Recognized Standard Goods for durability, quality and finish.

For sale by the Hardware Trade and

T. F. Cheritree & Co., New York.



We make a specialty of the LARGEST SIZES of Circular Saws, and call particularly attention of lumber manufacturers to the following points of excellence

EVENNESS OF TEMPER.

The peculiar structure of our furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

PERFECT ACCURACY IN THICKNESS.

Our saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCE IS PERFECTLY, which is proof positive of the right accomplishment of the work.

PROPERLY HAMMERED.

Great care is taken that no saw shall leave our works without due attention in this important particular.

A saw too tightly strained upon the rim, or too loose in the center, can not be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE.

This department is under the personal supervision of our Senior, who has devoted over twenty years to the art of saw making.

We are sole proprietors and manufacturers of the celebrated "Clipper" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

OHLEN & LANMAN.

Columbus, O.

Excelsior Saw Works.

515 Cherry St., Philadelphia.

WM. McNIECE,

Manufacturer of

Superior Cast Steel Hand, Panel,

Ripping, Ice, Compass, Hack,

Butchers' Bow, Grafting, Pruning,

Keyhole and Web Saws,

Mowing Knives, Trunk Springs,

And all other kinds of Springs, made from Sheet Cast Steel.



H. Croft's Scientific Concave and Convex Razor Strop

Is perhaps the only Strop manufactured on a strictly scientific principle. By a few passes over the Strop the Razor is enabled to pass through the hardest beard with ease, and is highly recommended by Barbers and all Scientific Men who have used it, and do cheerfully recommend it to be the best Strop that is sold in the market. The attention of dealers is solicited to this Strop, and whosoever can have, on application, a sample Strop sent free of charge on application to the Patentee at Springfield, Ohio.

Hardware.

1872.

Review of the Hardware Market for the Year.

(CONTINUED.)

JULY 4.—The close of the first half of the year naturally suggests a consideration of the changes that have taken place during that time. We think we are safe in saying that never before was there such an extraordinary state of things in the metal industries of both America and Europe as exists to-day. That in the United States, Great Britain and Germany, such great activity should simultaneously prevail is very remarkable, especially as the causes in each case seem to be to a great extent distinct. If iron continues to rule high, as there is now every indication that it will for many months, we see no prospect of any material decline in staple goods during the ensuing season; while it is almost certain there will be a good many advances. The changes taking effect on the 1st instant are not very numerous. Iron and Tinned Rivets are now discount 25 instead of 33 1/2 per cent. The discount on Coal Hods has been reduced 5 per cent., being now 40 per cent. on Japanese and 30 per cent. on Galvanized. Ely's Percussion Caps have been advanced 3d. per M on the other side, and here the prices have been advanced 7 1/2 cents per M. We quote, E. B. 1-4s, 67 1/2 cents 1-10s, 75 cents; Double Water Proof, 1-4s, \$1.57 1/2; 1-10s, \$1.65; Colt's 1-4s, 82 1/2 cents, 1-10s, 90 cents. Trace Chains, 65 cents, gold, for 6 1/2-10-2, and 70 cents, gold, for 7-10-2. Washington Mills Emery is now 7 cents for regular numbers, and 5 cents for Flour. Myers "Fashion" Fluter and Ruffler is now \$3 instead of \$3.50. Ames' Butcher and Shoe Knives are now discount 15 per cent. The manufacturers' price of Stocks and Dies has been advanced to discount 20 per cent. We quote them from stock in New York discount 15 to 10 and 10 per cent. Mann's Patent Metallic Sieves have been advanced 50 cents per dozen. Mallory, Wheeler & Co., under date of July 1st, issued a revised list of Padlocks, equalizing prices without materially advancing or reducing the cost of goods. The discount on Padlocks and Padlock Keys remains 40 per cent. They also add prices of a number of new Locks and Latches, the discount on which remains 45 per cent. We print their price list of Padlocks and new goods. Alfred Field & Co., in a circular dated July 1, note the following advances in leading English goods. Fire Irons have advanced about 25 per cent. on old prices. Curry Combs, average advance about 25 per cent.; one maker has advanced 40 per cent. All orders received after June 8th are subject to "times price." Padlocks have advanced from 10 per cent. to 20 per cent. Coil Chain has advanced from 13s. for 3/4 to 25s. Traces have advanced from 10 1/2 d. for 6 1/2-10-2 to 1s. 7 1/2 d. Wright's Anvils have advanced from 26s. to 32s. Wilkinson's Anvils have advanced from 24s. 6d. to 30s. Wright's Vises, solid box, have advanced from 4d. per lb., less 10 per cent., to 4 1/2 d., net. Fry Pans, hammered, have advanced from 7 1/2 per cent. to 50 per cent. discount. Hoes have advanced 20 per cent. and "times price." Waldron's Scythes advanced from 27 1/2 per cent. to 15 per cent. discount. Braden's Trowels have advanced from 10 per cent. to 5 per cent. discount. Ely's Caps advanced 3d. per M. Ely's Gray Edge Wads advanced 4d. per M. Guns advanced from 1s. 6d. to 10s., according to price. Bake Pans now 22 1/2 per cent. discount. The latest information states that the present advance on nearly all patterns of Curry Combs is 40 per cent.

JULY 11.—The usual midsummer dullness prevails, and some houses complain that so far the sales for this month fall short of the same period last year. The state of the German Hardware market is unimproved since our last writing. Recent advices state that no compromise with the workmen is possible under existing circumstances. The market for all classes of Hardware is decidedly firm. Peter Wright's Anvils have advanced; they are now quoted at 34s., and are firm here at 12 cents, gold. Addis's Carving Tools have advanced about 25 per cent.; Wilson's Butcher Knives have advanced 5 per cent. Nails are firm at \$5-75 rates. At a meeting of the Vise and Tool Association, held in Philadelphia on the 24th ult., the following prices were adopted: Solid Box Vises, from 30 to 110 lbs., 16 cents; 111 to 160 lbs., 17 cents; 160 and over, 30 cents. Steel Faced Hammers advanced 1 cent per lb. Mattocks advanced 75 cents per dozen. Grub Hoes advanced 25 cents per doz. The advance on Solid Box Vises is about 1 cent per lb. The prices of Rivets in bulk have advanced one cent per lb., excepting sizes 3/4, 1-1/2, 5-16, 3/8, No. 1, 2, 3, 4, and 1d., 2d., 3d., 4d., 5d., 6d. Cooper's, which have advanced 1/2 cent per lb. The discount of one cent per lb. on 6 and 7 lb. Rivets in bulk is discontinued. Gimlet Pointed Coach Screws have been advanced. We print the new list for Rivets in bulk and Coach Screws; the balance of the list is unchanged. At a general meeting of Edge Tool Manufacturers, held at the Cutler's Hall, Sheffield, on the 25th ult., new list prices were adopted, to go into effect on July 1st. We quote Butcher's Edge Tools, \$5-50 to £, gold, new list. This important list was published in our issue of the above date. Joseph Rodgers & Sons have issued a new list for Ivory Table Cutlery, on which they advance 10 per cent.

JULY 18.—The presence of a considerable number of buyers, from the South and West, has relieved the Hardware market of the general dullness which has characterized it for some weeks. A fair business is reported, with firm prices for both foreign and domestic goods, and a general scarcity of staples is noticeable. The

and T Hinges held a meeting on the 10th instant; prices remained unchanged, and may be quoted firm. The German importers of this city have adopted a new list, being an advance on the old of from 15 to 25 per cent. This list is only intended to apply to the stock on hand, as it is impossible to foreshadow the issue of the struggle now raging in Europe between capital and labor. Butchers' Light Edge Tools are quoted at \$5, and Heavy do. at \$6 to the £, gold, new list. Lane's Forged Cast Steel Planters' Hoes are advanced to 5 per cent. on list. T. F. Cheritree & Co. advise us that the prices of Livingston's Patent Braced Wood Saws, for the coming season, are, for No. 101, 30-inch, \$12; No. 102, "Red Jacket," 30-inch, \$12, and No. 104, "Green Jacket," stamped "E. W. Clark, Cast Steel," \$8 per dozen, net cash. Mason's Blacking has advanced 50 cents per gross for sizes Nos. 1, 2, 3, and \$1 per gross for No. 4. The Stanley Rule and Level Co. issue a discount sheet, under date of July 10, 1872. The following are the present discounts of such articles as have been advanced by the new sheet, viz: Handled Brad Awns, 10 per cent.; Sliding T Bevels, 35 per cent.; Compass Dividers, 10 per cent.; Bailey's Spoke Shaves, net; Try Squares, 35 per cent. Chalkline Reels and Scratch Awns are both reduced to 25 per cent. off. Cash discount from all the foregoing, 10 per cent., if paid within 30 days. The list price of No. 1 Mahogany Plumb and Level (adjustable) is advanced to \$35 per dozen. Another style of Bailey's patent Excelsior Block Plane, with handle, is added to the list—price, \$2-50. Also a new pattern of Cabinet makers' Clamp, with iron head and jaws. The list prices of Bailey's Smooth Planes (wood) are advanced 50 cents each, the discount remaining as before on the entire list of Iron and Wood Planes.

JULY 25.—The improved condition of the Hardware trade mentioned last week continues. The most noteworthy features of the week are the advances in Butt Hinges and Screws. The American and National Screw Companies, under date of July 22, advise us of an advance of 25 per cent. on Flat Head and 20 per cent. on Round Head Iron Screws; the discount off Flat Head is now 50 per cent., formerly 60 per cent., and off Round Head, 40 per cent., formerly 50 per cent.; the discount off Flat Head Brass, Fillister Head Iron, and Brass and Iron and Brass Machine Screws remains as before. In their circular they say, "Owing to the prospect of still further advances in Iron, all orders received after this date will be subject to prices ruling at time of shipment." The American Screw Co. issue a price list of Taps, which we publish. The manufacturers of Butt Hinges agreed on an advanced list for Broad and Narrow, Loose and Fast Joint Butts. We print the new and old prices; the discounts remain unchanged. The Pump Manufacturers' Association of the United States have issued their quarterly circular, in which they say of their meeting, held in Utica on the 10th instant: "It was agreed that the discounts from list during the previous quarter be retained, viz: Iron and Brass Cast-iron and Pitcher Pumps, discount 20 per cent. Well and Set Length and Drive Well Pumps, Iron Force Pumps, Hydraulic Rams and Garden Engines, discount 15 per cent. The Nail Manufacturers', at their meeting in Boston on the 17th instant, made no change in prices. We quote 10d to 60d common, \$5-75 per keg. Alfred Field & Co. have received a cable dispatch announcing a still further advance in Coil Chain. They quote as follows: 3-16, 41s. 6d.; 3/8, 31s.; 5-16, 28s.; 3/4, 26s.; 7-16, 24s.; 1/2, 23s.; 3/8, 22s.—Traces are firm at 1s. 8d. for 6 1/2-10-2. Respecting the charges for extras on Chains, the following from a recent Birmingham letter will be of interest: "The extras on Tin Plates are now 8s. instead of 6s.; the extras on Traces are advanced; twisting is now 1/2 d. per pair, instead of 3/4 d.; 7 feet, 1 1/2 d. over 6 1/2 feet instead of 1d.; difference between 10 and 12 link 2d., instead of 1 1/2 d.; 12 and 14 link 2 1/2 d., instead of 2d.; No. 2s are 2d. extra to No. 3s; No. 1 are 3d. extra to No. 2s." Braden's Trowels have advanced to add 5 per cent., formerly discount 10 per cent. Braden's Crown Hoes have also advanced; they are now quoted discount 12 1/2, formerly 30 per cent. R. Parker's Gimlet Pointed Screws are offered from stock as follows: Flat Head Iron, 3/4 to 1 1/2 inch, discount 50 and 15 per cent.; 1 and 1 1/2 inch, discount 50 and 10 per cent.; 1 1/2, 2, 2 1/2 inch, discount 50 and 7 1/2 per cent. currency, from American list. We quote Nettlefold and Chamberlain's Screws as follows: Iron Flat Head, No. 0 to 7, discount 50 and 10 per cent.; Nos. 8 to 30, discount 50 and 5 per cent. J. P. Verree & Co.'s Hatchets and Hammers have advanced to discount 5 per cent. Sargent & Co. issued their Hardware Bulletin on the 22nd instant. We publish their changes in lists and discounts since 17th instant.

AUGUST 1.—There are a good many Western buyers in town and some complaints are heard that orders are not as liberal as was expected. This is mainly due to the fact that large purchases were made in the spring in anticipation of the heavy advances that have since taken place. Prices are strong, with talk of further advances. German goods may be said to be practically out of the market. English goods high in price and short supply. Hart Mfg. Co., English Square Co., and the Southington Cutlery Co., have advanced the price of Carpenters' Steel and Iron Squares as follows: By the case, discount 10 per cent.; less than full case of a kind, net. Parties who become entitled to the full discount on Steel Squares will be allowed 5 per cent. discount on prices for nickel plating. J. & Riley Carr will issue a circular, dated August 1st, making the price of "Dog Brand" Files and Rasps \$5-50 to £, gold, and Horse Rasps, if sold alone, \$5-75 to £, gold. Sargent & Co., Charles Parker and Peck, Stow & Wilcox have advanced Saw Rods 10 per cent., the price now being list net. A considerable advance in Curry Combs has taken place in England. Providence Plate Hinges have advanced from discount 10 to 5 per cent. On account of scarcity, city dealers

have advanced Maydole's Hammers to net list. The Douglas Axe Company have advanced Hunt's Axes \$1 per dozen, the discount remaining as before. We quote them net to discount 5 per cent. Burden's Horse Shoes have been advanced to \$6-50 per keg at Troy, and Mule Shoes \$7-50. Freight to this city 10 cents. We quote Seymour's Shears discount 50 per cent. Market Wire has been advanced 5 per cent. John Russell Mfg. Co. make some changes in their April price list, which we publish. Also changes of Landers, Frary & Clark in their May price list. Clark, Wilson & Co., agents for the "L'Hommedieu" Ship Auger and the Elmira Nobles Mfg. Co., making the "Watrous" Ship Auger, have adopted a new list, dated July 25th, with a view to equalize rates on sizes. Nails are unchanged. We quote \$5-75 rates.

AUGUST 8.—There is a fair trade doing in General Hardware, and the number of Western merchants in this city has largely increased since our last issue. There is an active inquiry for goods, and great caution is noticeable in the placing of orders. Prices are well maintained, and with the present high cost of labor and material, there is little prospect of a reaction. English Hardware is in good demand, and advances are still in order. Cheap guns have advanced about 30 per cent. Peter Wright's Anvils are scarce, and importers are largely sold ahead. Coil Chain and Traces are in short supply. The total advance on English Curry Combs to date foots up to 70 per cent. Stubbs' Files are 10 per cent. off the sterling list, "time price." Mann's Axes have advanced \$1 per dozen. The Newhouse Traps will be advanced 5 per cent. on the 15th inst. The list of Kentucky Star Cow Bells has been reduced for numbers from 2 to 7 inclusive, and the discount has been reduced from 30 and 10 per cent. to discount 10 and 10 per cent. Russell, Birdsall & Ward have advanced the price of their Carriage and Tire Bolts to discount 45 per cent. The price of Plow Bolts in bulk has been advanced one cent per lb. Terms, 4 months, or 5 per cent. discount for cash. Their list is unchanged. The Peck, Stow & Wilcox Co. have issued a new discount sheet, which we publish. Hubbard & Curtis Mfg. Co. have changed the list on Van Sand's patent Blind Fasteners, No. 2000, from \$12 to \$14 per gross. The Nail market is demoralized; the card rates are unchanged, and holders still ask \$5-75 rates, but Nails have been sold to-day at prices ranging from \$5-25 to \$5-75, 100 keg lots being freely offered at the former price.

AUGUST 15.—There is a marked improvement in the demand for Hardware over the previous week. Money is more abundant, and present appearances indicate a healthy trade all over the country. The changes to note are few. The Union Nut Co. advanced their Carriage Bolts on the 8th inst. from discount 50 and 5 to 50 per cent. Washington Mills Emery has been advanced from 8 to 8 1/2 cents per lb. for regular numbers, and from 5 to 6 1/2 cents per lb. for Flour. From this date the discount from both "Newhouse" and "Hawley and Norton" brands of steel Traps will be 17 1/2 per cent. On the 13th inst. Manila Cordage declined half a cent a pound, and Sial Cordage 1 cent; we publish the new list. Hermann Boker & Co. quote German Wood Screws from stock at discount 50 and 10 per cent. They also report that their Scissors makers in Germany have all gone back to work, and they will soon be able to supply the demand. The card rate for Nails, viz., \$5-75, is only nominal.

AUGUST 22.—Although buyers as a rule are not placing heavy orders for fall wants, still the volume of business transacted during the past week is satisfactory. The market for all kinds of Hardware is firm. The sterling price of Stubbs' Files has been advanced from discount 10 per cent. to list net, and holders ask \$8 to \$8-25, gold, from stock. Cow Ties have advanced 30 cents per dozen. Tin Lined Lead Pipe has been advanced from 15 to 16 1/2 cents per lb., less 10 per cent. Ames Shovels and Spades are in short supply and holders ask net list. We quote list to discount 2 1/2 per cent. Collins & Co.'s Wrenches are discount 35 per cent. instead of 40 per cent. as formerly. Reese, Graff & Co., of Pittsburgh, advise us that owing to the advance of stock and labor, the price of solid Cast Steel Anvils is advanced to 14 cents per lb., formerly 12 cents. The Nail Manufacturers held a meeting to-day, and advanced the card rates to \$5-80 for 10d. to 60d. Graham & Haines, 77 Chambers street, have in press their new discount sheet and appendix to catalogue of 1872. We reproduce such portions of it as have not already been noticed in our columns.

AUGUST 29.—Discount sheets and revised lists are being issued, and there is a good demand for reasonable goods without the slightest shade of speculative inquiry. On the 27th instant the manufacturers of Wrought Hinges advanced their prices. Burden's and Rhode Island Horse Shoes have advanced 25 cents per keg. We quote Burden's and Rhode Island Horse Shoes (Perkin's pattern) \$6-85; Rhode Island pattern, \$7-35, and Mule Shoes \$7-85 per keg, delivered in New York, or from Troy or Rhode Island 10 cents per keg less. On the 26th instant the manufacturers of genuine Chester Emery fixed the price for Grain Emery at 8 cents, and Flour 5 cents per pound. They also give notice that they are prepared to furnish a second quality of Emery at 5 cents for Grains, and 4 cents for Flours. Mallory, Wheeler & Co. have issued a revised price list of Door Locks, Knobs, etc. This list, bearing date August 17th, was adopted on the 34th instant. The discount has been changed from 45 per cent. to 40 and 2 per cent. for cash in 30 days. This revision of list and discount makes the net prices the same as those manufacturers from whose lists a discount of 25 per cent. is allowed. Sargent & Co. have issued this week their Appendix No. 2, containing illustrations and lists of the new goods manufactured by them since their large book of 1871 was published, and also the goods advertised in their Appendix No. 1. They have also published their discount sheet revised to date. The Hart Manufacturing Company also publish this week their discount sheet and appendix to catalogue. Hunt's Shingling, Claw and Lathing Hatchets are now net list, formerly discount 5 per cent. Moss & Gamble's Files are now \$5-25 to \$5-75 to £, gold. Nails are firm at card rates, viz., \$5-80. There are no changes to report in English or German Hardware. Traces are in short supply, and orders to import are taken at time price. Coil Chains and Anvils are firm at our quotations.

SEPTEMBER 5.—There is a fair trade doing, and some of the larger houses are fully employed, yet complaints of light business are frequent, especially amongst jobbers. The list of Beatty's Butchers' Cleavers has been advanced, the discount remaining as before, viz., 10 per cent. London Mills Emery is advanced to 9 1/2 cents for Grain, and 5 1/2 cents for Flour. The Sandusky Tool Co's Planes have advanced to discount 30 per cent., formerly 35 per cent., and "Ogonts" to discount 35 per cent., formerly 40 per cent. Sargent & Co. quote Washita, and Arkansas Stone as follows: Washita, 1 Extra, 36 cents; No. 1, 24 cents; 2, 19 cents; Rd Edge Slips, 49 cents; Washita Square Edge Slips, 55 cents; Arkansas No. 1, \$1-38; No. 2, 80 cents per lb.—all 10 per cent. discount for cash. The Stanley Works issue their revised discount sheet. Hermann Boker & Co. have advanced the price of Common Double Guns to \$4-50, gold, formerly \$4. Common Razors have advanced 10 per cent. At a meeting of the "Western Nail Association," held at Pittsburgh on the 30th ult., Nails were advanced 25 cents a keg. We quote them firm here at \$5-80 rates.

SEPTEMBER 12.—Business this week is a great improvement on the preceding, and the evidences are plain that the fall trade is upon us. Manufacturers are driven to their utmost capacity, and prices for all kinds of Hardware are firm and fully maintained. The following advances are made on the price list for Trenton Tools of July: Solid Box Vises, 1 cent per lb.; Steel Face Hammers and Sledges, all kinds, 1 cent per lb.; all Solid Steel Wedges and Hammers, 1 cent per lb.; Wedges and Crowbars, 1 cent per lb.; R. R. Clay and Stone Picks and Mattocks, 50 cents per dozen; Grub Hoes and Coal Picks, 25 cents per dozen. The Russell & Erwin Manufacturing Co. have published to-day their revised price list of Padlocks—discount 40 and 2 per cent. Under date of 9th instant, the Stair Rod Manufacturers have issued a circular, in which they say: "The advance in the price of Metals since our last circular was issued, compels us again to make a corresponding advance in the price of Stair Rods. The present list will be increased 25 per cent., and a discount of 25 per cent., net, 30 days, allowed from the new list." F. Wiebusch reports a further advance in English and German Cow Ties of 10 per cent. Harvey W. Peace quotes his patent Elliptic Wood Saws, with No. 40 blades, at \$10 per dozen, net; in lots of 25 dozen, \$9 per dozen, net. The manufacturers of Cordage issued a revised price list yesterday, which is a decline of 1/4 cent per pound on former quotations. Nails are firm at the established rates. The indications point strongly to a further advance. The Eagle Mills Manufacturing Company issued their discount sheet on the 1st instant.

SEPTEMBER 19.—The improved demand for General Hardware mentioned last week has steadily increased, and trade is now fairly active. With the exception of a few articles, which we mention, prices have been fully maintained. Stebbins' Molasses and Oil Gates have been reduced from discount 40 and 10 to discount 50 and 10 per cent., but the impression prevails that the latter discount will not hold good for any length of time, and that before long they will be held at previous figures. The manufacturers of Boxwood and Ivory Rules held a meeting, at which it was decided to reduce the price of their goods to discount 30 and 10 per cent., instead of 35 and 10 as formerly. Sargent & Co., under date of the 16th instant, issue a special number of their Hardware Bulletin, illustrating a variety of seasonal goods. The discount from new list of Wrought and Galvanized Iron Pipe is 45 per cent. Graham & Haines quote the Enterprise Meat Chopper at \$12 each, instead of \$10 as before announced, less discount 20 per cent. The New York Plow Company quote their Solid Eye Sash Weights at 3 1/2 cents, free on board at New York, Newark, N. J., and Peekskill, N. Y. Clark, Wilson & Co. give notice of an advance in the goods of the Snell Manufacturing Company; "Until further advised, the terms will be 15 per cent. discount, though in special cases, and when orders exceed \$1000, we may be induced to make some concession." The Judd Manufacturing Company have issued a new discount sheet, in which they say "all previous discount sheets are void." They also publish in book form a comprehensive catalogue of their goods. At the meeting of Nail Manufacturers, held in this city on the 12th instant, the price of Nails was advanced 20 cents per keg, the discount of 15 cents per keg on lots of 100 kegs, and 20 cents per keg on lots of 1000 kegs, remains as before. We quote 10d. to 60d. \$5 rates, demand good and market firm.

SEPTEMBER 26.—There is a good demand for seasonal goods. Prices are well maintained. The Peck, Stow & Wilcox Manufacturing Company advance their Fry Pans to discount 15 per cent., formerly 30 per cent. Tanged Firmer Chisels are now discount 40 to 40 and 10, formerly 40 and 10 to 50 per cent. The Stanley Rule and Level Company have added to their assortment of tools a patent (Bailey's) Flush T Bevel; prices, 8 inch, \$14; 10 inch, \$16; discount 16 and 10 per cent. We note a change of discount from 30 and 10 to 35 and 10 per cent. off on Wheeler's Patent Countersinks on last discount sheet of Stanley Rule and Level Company. Collins & Co. have issued, under date of 20th instant, their revised price list, the important feature of which is an advance of 50 cents per dozen on Kentucky and Yankee pattern Axes. We publish the revised list for Hay, Manure and Spading Forks, Garden Rakes, etc., issued under date of 1st proximo, by Sheble & Fisher, Philadelphia, the discount from which is 25 per cent. There is no change to note in the values of foreign Hardware. We have heard of a slight advance on the sterling price of Spear & Jackson's Saws, but it will not affect the price here, at least for the present. We quote these goods, \$4-50 to £, gold.

(To be Continued.)



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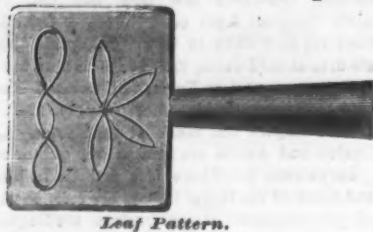
Sheffield, Eng.

BARTON, ALEXANDER & WALLER

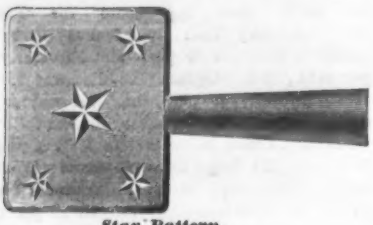
101 & 103 Duane St., New York.

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Patent Embossed Steel



Leaf Pattern.



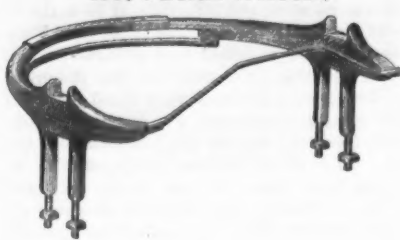
Star Pattern.

King Bolt Yokes.

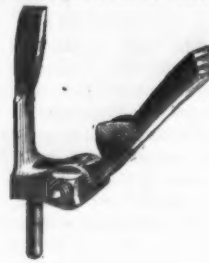


Established 1850.

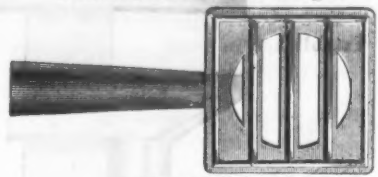
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

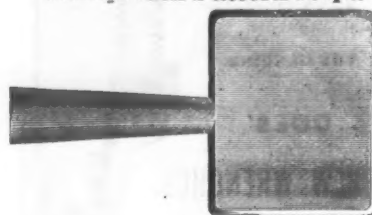


Upper View.

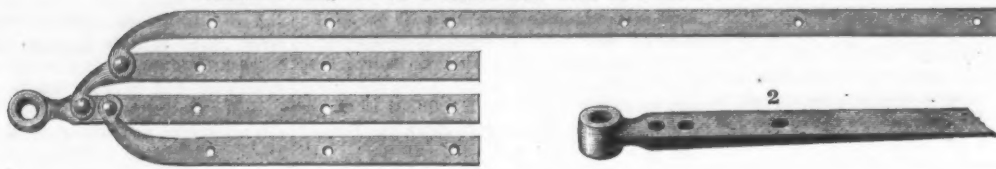


Lower View.

Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



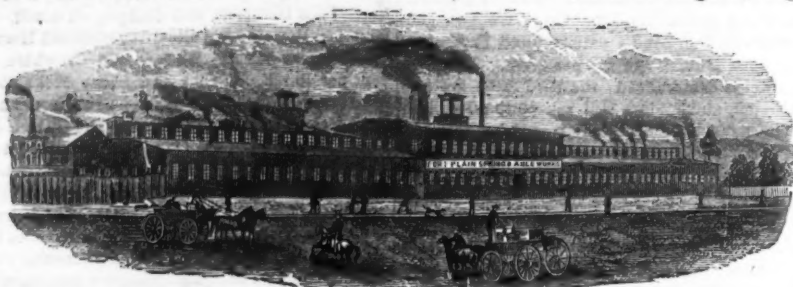
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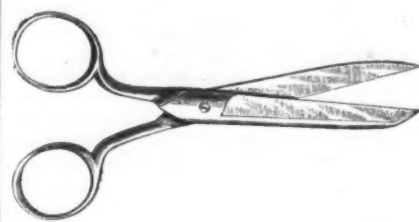
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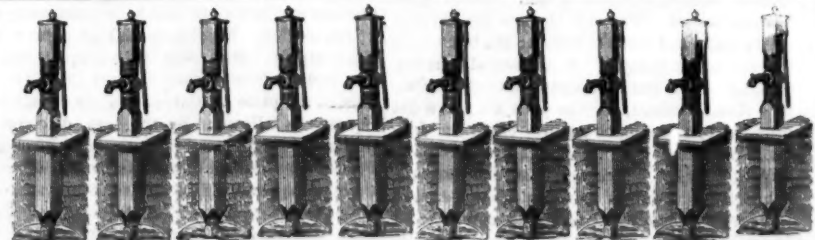
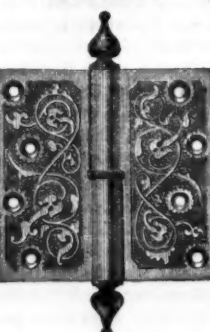
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Sandsky Tool Co., Sandsky, O.	2
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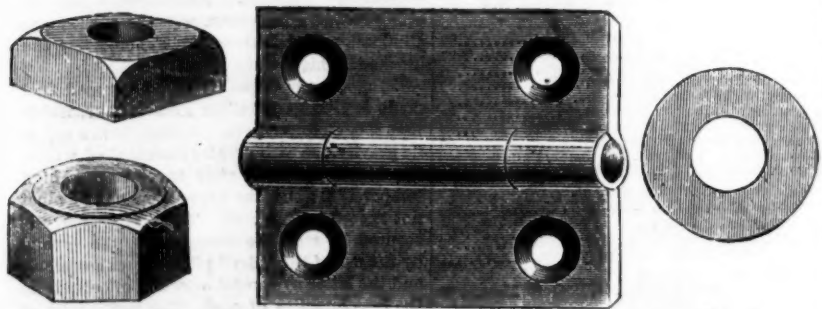
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The Iron Age.

New York, Thursday, January 23, 1873.

DAVID WILLIAMS, Publisher and Proprietor.
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JOHN S. KING, Business Manager.

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Railroad Progress in 1872.

The statistics of railway progress given below, show that we built 7613 miles in 1872, against 7878 in 1871 and 7433 in 1870. The total length of finished roadway in the United States on the 31st of December, 1872, was 70,178 miles, to which must be added about 40,000 miles under construction and projected. The following table shows the total mileage in the several States and Territories, December 31st, 1872, as compared with December 31st, 1871:

STATES, &c.	1871.	1872.
Maine.....	873	922
New Hampshire.....	797	831
Vermont.....	711	764
Massachusetts.....	1,642	1,648
Rhode Island.....	138	139
Connecticut.....	826	907
Eastern States.....	4,984	5,306
New York.....	4,253	4,901
New Jersey.....	1,049	1,379
Pennsylvania.....	5,531	5,787
Delaware.....	298	331
Maryland and Dist. of Columbia.....	813	821
West Virginia.....	478	512
Middle States.....	12,322	13,671
Ohio.....	3,860	3,962
Michigan.....	2,638	2,997
Indiana.....	3,709	3,829
Illinois.....	6,354	6,901
Wisconsin.....	1,653	2,219
Minnesota.....	1,553	1,855
Iowa.....	3,162	3,573
Kansas.....	1,703	2,117
Nebraska.....	906	1,192
Missouri.....	2,864	2,977
Colorado Territory.....	443	557
Dakota Territory.....	61	323
Utah Territory.....	.....	.....
Montana Territory.....	.....	.....
Wyoming Territory.....	454	454
Western States, &c.....	29,819	33,062
Virginia.....	1,478	1,516
North Carolina.....	1,267	1,316
South Carolina.....	1,210	1,291
Georgia.....	2,107	2,217
Florida.....	467	467
Alabama.....	1,098	1,239
Mississippi.....	624	680
Louisiana.....	822	908
Texas.....	797	1,301
Indian Territory.....	148	313
Arkansas.....	490	679
Tennessee.....	1,321	1,552
Kentucky.....	1,018	1,173
Southern States, &c.....	13,751	15,351
California.....	1,111	1,322
Oregon.....	199	298
Nevada.....	667	692
Utah Territory.....	312	351
Washington Territory.....	.....	55
Arizona Territory.....	.....	.....
New Mexico Territory.....	.....	.....
Pacific States, &c.....	2,189	2,838
Total United States.....	60,565	70,178

The fact that, of nearly 50,000 miles of railroad projected or in course of construction during the year, only 7613 miles were completed, is attributable chiefly to the difficulties experienced during 1872 in raising, especially in the foreign markets, the capital needed for the vigorous prosecution of such enterprises. In Germany a wild season of speculative excitement followed the close of the war with France, but capital chiefly sought local investments, and American securities of all kinds have been in less

favor than those offering larger, but less substantial, promises of profit to purchasers. In England, the fortunate speculation of the German investors who bought our 5-20's of '62 at a liberal discount, and not only received regular interest, but the full value of their bonds when called in and cancelled by the Treasury, had the effect of popularizing governments over all other American securities; and, having repented of refusing our 6 per cent. bonds, British capitalists bought a very large share of the new 5 per cents. issued in the place of the 6 per cents. which the German holders had surrendered. Following this came the Alabama negotiations, pending the settlement of which, under the Treaty of Washington, American investments were regarded with caution, and for the last three months of the year the stringency in money rendered the market for investment securities of all kinds dull and heavy.

In our own market there was a fair demand for railroad securities until the Autumn stringency was felt, but, as a whole, the year was unfavorable for raising money on such securities, although from causes which imply no lack of confidence in their value on the part of those with capital for investment. For this reason, however, the roads now in progress have been less liberally supplied with the means necessary to rapid completion and extension. Another cause of diminished energy was the advance in the price of railroad iron, which, by so greatly increasing the cost of completing new roads, encouraged a postponement of track-laying in the expectation of lower prices. We take the following from the annual circular of Messrs. Bigelow & Johnson, dated January 1st, 1873:

"The import in 1872, at this port, falls short of that of 1871 to the extent of 37,363 tons, though this by no means represents the actual decrease, as the import of Bessemer steel rails has greatly increased, and such are included in our aggregate quantity. Business in iron rails has for some months been slow and dragging in character, partly owing to the inability of some and the unwillingness of other railroad companies to follow the advance in prices. The investment of foreign and domestic capital in the bonds of new roads has also greatly fallen off, and the stringency which has been more or less for a length of time so marked a feature in our own money markets, has compelled the abandonment or postponement of numerous schemes. It is true that we have probably added some thousands to the completed mileage in 1872, and the urgent demands of commerce will continue to offer temptations to capital in this direction, but the number of schemes has been sifted down to those that are generally on a sound basis and really necessary to the comfort and prosperity of the sections through which they are intended to run. The manufacture of Bessemer steel rails has made steady progress, and there is a growing conviction, manifested not only in the abundance of orders enjoyed by those works devoted to this branch in the United States, but in the increasing imports from abroad, that to those railroads possessing a rapidly growing traffic, and whose resources will admit of the extra outlay, they are in the long run by far the cheapest material. The rail mills of the United States have generally been well employed, at least those located west of the Alleghany Mountains. In the East, particularly on the coast, there has been a scarcity of working work. Our production in that section has therefore somewhat fallen off, though we estimate the total for the year at all points to be not far from 700,000 tons. We subjoin the prices of foreign rails ruling at the commencement of each month in 1872, comparing with those at the corresponding period in 1871, with this remark—that the duty which till August 1st, 1872, amounted to \$15.68 per ton, gold, became thereafter ten per cent. less, or, say, \$14.12 per ton; but the change had no perceptible effect on prices."

GOLD PRICES.

	Jan.	Feb.	March.	April.
1872	\$58 to 59	62 to 63	65 to 65 1/2	72 to 73
1871	54 to 55	55 to 56	56 to 57	56 to 56

	May.	June.	July.	Aug.
1872	\$75 to 76	73 to 74	72 to 73	72 to 73
1871	55 to 56	55 to 56 1/2	56 1/2 to 57	56 1/2 to 57 1/2

	Sept.	Oct.	Nov.	Dec.
1872	\$75 to 76	75 to 76	73 to 74	70 to 72
1871	56 1/2 to 57 1/2	57 to 58	58	58

The course of the market for American rails is shown by the following comparison of prices, currency:

	1871.	1872.
January 1.....	\$68.00 @ \$70.00	\$70.00 @ \$72.00
July 1.....	70.00	83.00 @ 86.00
Dec. 1.....	70.00 @ 71.00	80.00 @ 82.50

The opinion has gained ground during the past few years that, in the direction of railroad expansion, our progress has been too rapid, and that our financial system is not sufficiently elastic to admit of the safe conversion of so large a proportion of our floating into fixed capital. When we consider, however, the area of our country, the variety of its sources of wealth yet undeveloped, or only developed in part, the volume of our internal commerce, and the extent to which our railroad system increases our capacity for production and exchange, it is easy to see that we have not yet reached the point when building railroads will impoverish the nation. With our rapidly increasing population we annually need increased and extended facilities for intercommunication; new sections must be opened to settlement, and new sources of production tapped. While we are running thousands of miles of road through hitherto undeveloped country, Europe is sending here, weekly, its thousands of able-bodied emigrants to cultivate these lands. Within the last few years the inflow of immigration has largely increased. During 1872, 217 immigrants arrived at the port of New York 291,217 immigrants, against 229,639 in 1871, an increase of 61,578 in one year. During the past ten years about three millions of immigrants

have come here to remain, and from this time on a steady annual increase may be expected. These new settlers are all producers, and about one-half seek the far West to settle upon the new lands not hitherto brought under cultivation. Instead of being, as formerly, chiefly unskilled laborers without means, a considerable proportion of the number are experienced farmers, who have given up their lands in England and Germany to avail themselves of the greater advantages offered in the virgin lands of this country, and who bring with them capital enough to purchase farms and stock them. This annual accession of population is a matter of the greatest practical importance, and there are indications which warrant the belief that the westward flow of European emigration has only just begun. The old world is feeling, for the first time, the full effects of the competition of our cheaper lands, and with the population and cultivation of these lands comes an imperative demand for more railroads. We think, therefore, that a fair consideration of all the facts affecting the extension of our railroad system will lead to the conclusion that these works lay the basis for so rapid and sustained a development of the resources and commerce of the country that we could well afford to invest a larger percentage of our annual increase of wealth than has yet been expended in railroad construction. We have, however, learned from experience the vicious results of the system of encouraging enterprise in this direction by liberal subscriptions of public funds in aid of railroad construction. When such aid has been given, the result, with but few exceptions, has been that speculators in legislative favors and franchises have enriched themselves at the expense of the taxpayers, in the construction of roads that, but for such aid, would never have been built. When this matter is left wholly to private enterprise, no railroads are built without a definite and well considered purpose, and with a view to the accommodation of an existing or possible traffic: and as those who project such roads must themselves assume the greatest risk of loss or disappointment, self interest, enlightened by experience, may safely be left to determine the question of whether we shall build one thousand or ten thousand miles per annum.

In another part of this issue we present two interesting tables, showing, respectively, the relation of mileage in the several States to area, population and valuation, and the comparative total mileage of the United States and other countries.

Kirkaldy's Classification of Wrought Iron.

About ten years ago Mr. David Kirkaldy published his "Experiments on Wrought Iron and Steel." Previous to that time this important branch of science was but little understood, and rested on a few isolated experiments, which have since been proved to be fallacious. The best illustration of this is found in the generally received belief as to the properties of Swedish iron. Engineer's tables give best Swedish bar 72,000 lbs., ultimate tensile strength per square inch, whilst the fact is that the ultimate tensile strength is but about 49,000 lbs. per square inch; and although this tensile strength is much lower than many kinds of common English bar iron, the tensile strength is not considered the criterion of value: the criterion of value of this iron is the contraction of its area at fracture when tested, as this iron is much softer than English iron; and when the strain is applied, breaks gradually with an invariably fibrous appearance; whilst some kinds of common English iron vary from 52,000 to 66,000 lbs. per square inch, with a much smaller contraction of area at fracture, and with a coarse, irregular and partly crystalline fracture.

These facts are the basis of Kirkaldy's classification of wrought iron. His conclusions are as follows:

- 1st. The breaking strain does not indicate the quality, as hitherto assumed.
- 2d. A high breaking strain may be due to the iron being of superior quality, dense, fine, and moderately soft; or simply to its being very hard and unyielding.
- 3d. A low breaking strain may be due to looseness and coarseness in the texture, or to extreme softness, although very close and fine in quality.
- 4th. The contraction of area at fracture, previously overlooked, forms an essential element in estimating the quality of specimens.
- 5th. The respective merits of various specimens can be correctly ascertained by comparing the breaking strain jointly with the contraction of area.
- 6th. Inferior qualities show a much greater variation in the breaking strain than superior.
- 7th. Greater differences exist between small and large bars in coarse than in fine varieties.

These conclusions led the engineers in the public works department for India to adopt his classification of wrought iron in drawing up specifications founded on the results of his different experiments on iron of different well known brands, classified according to their ultimate strength and softness. These classifications are as follows:

DESCRIPTION.	CLASS C.		CLASS D.		CLASS E.		CLASS F.		CLASS G.	
	Ultimate stress per square inch at fracture.	Contraction of area at fracture.	Ultimate stress per square inch at fracture.	Contraction of area at fracture.	Ultimate stress per square inch at fracture.	Contraction of area at fracture.	Ultimate stress per square inch at fracture.	Contraction of area at fracture.	Ultimate stress per square inch at fracture.	Contraction of area at fracture.
Bars, round or square.	27	45	29	35	30	25	23	20	20	15
Bars, flat.	26	40	25	30	25	23	22	16	16	12
Angle and Tee or T.	25	30	24	28	23	22	21	15	15	11
Plates, crossway.	24	28	23	27	22	21	20	14	14	10
Plates, lengthway.	23	27	22	26	21	20	19	13	13	9
Plates, crossway.	22	26	21	25	20	19	18	12	12	8
Plates, lengthway.	21	25	20	24	19	18	17	11	11	7
Plates, crossway.	20	24	19	23	18	17	16	10	10	6
Plates, lengthway.	19	23	18	22	17	16	15	9	9	5

N.B.—Classes A B are reserved for any special qualities of iron which might be required at any future time.

Ultimate stress 22 tons. Contraction of 60 per cent. area at fracture.

TESTING CLAUSE TO BE INSERTED IN "CONDITIONS OF CONTRACT."

The iron to be of such quality as to stand the following tests:

ULTIMATE TENSILE STRENGTH PER SQUARE INCH.

CONTRACTION OF AREA AT FRACTURE.

Average Tons. Average per cent.

Bars, round and square. Figures from table of quality.

Bars, flat. Figures from table of quality.

Angle and Tee. Figures from table of quality.

Plates, crossway. Figures from table of quality.

Plates, lengthway. Figures from table of quality.

The superintending engineer, or his deputy, will select materials representing 4 per cent. of the value, from which will be cut pieces 20 inches in length, and of plates and sheets 20 inches by 15 inches.

These pieces, after being stamped at or near the ends with the inspector's stamp, in addition to the maker's brand, are sent to Mr. David Kirkaldy, Testing and Experimenting Works, The Grove, Southwark street, London, S. E., to be tested and reported upon.

The iron will be accepted, although under the above specified strain, provided the contraction of area at fracture is the same per cent. higher, or, in other words, softer iron than that specified will be accepted.

These tests are approved generally by European engineers, and are entitled to the careful consideration of engineers in this country.

The Reading Railroad and the Coal Trade.

Whatever may be the ultimate purpose of the Reading Railroad Company in establishing a retail business in Philadelphia, the immediate effect of the movement is likely to be decidedly in favor of the consumer. Mr. Gowan, president of the company, in a letter to the Philadelphia Ledger, denies any intention of coercing the small operators into consolidation with the Reading Coal and Iron Company, and charges that the retailers, who are making the loudest complaints, have themselves combined to prevent competition. He admits that the Reading Railroad Company have opened several retail yards, and will open several more in the Spring, but says that the company "will never sell coal by retail except at such a price as will yield a fair profit over and above the wholesale price of coal at the mines, added to the cost of transportation to the yard. That it can secure a fair profit, and yet sell coal at from \$1 to \$1.50 per ton less than has generally been charged, will be evident to any one who is at all familiar with the trade." Perhaps this is where the shoe pinches. Mr. Gowan compares the cost of a ton of coal at the company's yard and at the yards of private retailers, as follows:

	Co.'s Yard.	Retail Yard.
Cost of coal.....	\$2.75	\$2.75
Transportation.....	0.25	0.25
Rent of yard.....	0.10	0.60
Yard expenses.....	0.10	0.45
Profit.....	0.15	0.75
Total.....	\$3.25	\$4.80

And adds, in conclusion, that "\$1 per ton saved in the cost of coal, in Philadelphia, adds over \$1,000,000 per annum to the wealth of the city."

So far, so good. The retailing of coal is certainly a proper and legitimate branch of business for a company engaged in both mining and transportation, and if it can sell to consumers direct at a lower price than they can be supplied through the agency of the dealers, clearly the dealers must and should withdraw from the business. No man, whatever his occupation, can expect to make money unless his services are worth paying for, and middle men are only tolerated so long as, by facilitating exchanges between producer and consumer, they render the community services equal in value to the profits they include in the prices charged consumers. This rule is of universal application, and the only exceptions to it are found in the case of swindlers who make profits without giving value. If, therefore, the Reading Railroad Company can sell coal below the current retail price, and are disposed to do so, the retailers must either compete with them on equal terms or withdraw from the business. But what will follow? When the company, by selling at lower prices than individual retailers can afford to sell at, has acquired a legitimate and proper monopoly of their business, will they continue to give consumers the benefit of their ability to sell coal at cost, plus a profit of 15c. per ton; or will they take advantage of the opportunity to charge the highest prices which consumers will pay? Corporations, particularly those controlling large capital and wielding vast influence, have no consciences; and we have learned from experience the difference between what companies can do and what they are disposed to do. Practically, Philadelphia consumers are at the mercy of the Reading Railroad Company, and while the intentions of the management of that corporation may be good at the present time, it remains to be seen whether or not the temporary advantages enjoyed by consumers will be gained at the expense of future short supplies and high prices.

The Five Gas Stokers.

The sentence of five gas stokers to one year's imprisonment for conspiracy, is just now causing intense excitement in England, especially among the working classes. The circumstances of the case are as follows: The stokers in question were employed on contracts requiring that they should not quit work without giving notice of from one week to one month. They were all members of a trade union, and when one of their number was discharged for some cause which did not appear on the trial, the others made a demand that he be reinstated, which was refused. On the 2d of December last, notice was given to the company that if the man was not reinstated they would not go to work. The demand was still refused, and the stokers' union declared a strike, upon which the company brought suit against the five stokers who had incited the strike, on the criminal charge of conspiracy. The case was brought to trial and, within twenty minutes after their retirement for deliberation, the jury returned a verdict of guilty, upon which the court sentenced the prisoners to one year's imprisonment. We take the following from the judge's charge:

The prisoners were the principals—the chief actors; two of them were delegates chosen by the men, and therefore evidently men to whom they looked up. They took a leading part in the conspiracy. Therefore, notwithstanding their good character, they had unfortunately put themselves into the position of being properly convicted of a dangerous and wicked conspiracy. The time had come when a serious punishment, and not a nominal or a light one, must be inflicted—a punishment that would teach men in their position that although, without offense, they might be members of a trade union, or might agree to go into an employment or to leave it without committing any offense, yet that they must take care when they agreed together that they must not agree to do it by illegal means. If they did that they were guilty of conspiracy, and if they misled others they were guilty of a wicked conspiracy.

It is evident that the law under which this conviction was secured admits of a very much wider application than would be safe to give it; and it is not to be wondered at that public opinion fails to recognize the justice of the punishment which the five stokers have been compelled to suffer. The inconvenience and danger resulting from a stoppage of the gas supply of London was merely incidental, and against such a danger the companies should protect the community, not the courts. We have no sympathy with strikes organized upon such pretenses under any circumstances, but do not think that the power of the law should be employed to prevent men in any trade from taking such action as they may choose, provided they do not interfere with the right of others to work or refrain from working. The effects of such interference will be worse than the evils which it is designed to remedy; for if the idea gains ground that capital is persecuting labor, through the agency of unjust and arbitrary laws, labor will be sus-

tained by public opinion in the most overt and unjustifiable acts of retaliation. It is better to leave the adjustment of all differences between labor and capital to the operation of the natural laws of competition, and all that the courts can properly undertake is the protection of the individual and corporate rights recognized by the common law.

The Gilbert Elevated Railway and Its Connections.

On another page we publish, with illustration, a description of the Gilbert Elevated Railway, chartered by the legislature last winter, and now about to be built. The importance of this project arises from the necessity which has long been felt of conveying passengers arriving from the north, east, and west into the heart of the city. With the completion of the road, trains from Albany, Montreal, and Boston, by the New York and Boston Railroad, will cross the Harlem River, near High Bridge, and proceed directly to the City Hall and intermediate points in the city, and trains arriving from the west, by the Erie Railway, will cross the Hudson River by the suspension bridge to be located near Peekskill, and passing down by the New York and Boston Railroad, will connect with the elevated railway at High Bridge. Passengers now arriving at Jersey City, and who are compelled to submit to the inconvenience of the ferries, will then be conveyed directly into the city, and be spared the trouble of changing from car to boat. The importance of the project is also enhanced by recent railway combinations, which will make the Gilbert Elevated Railway the terminus of several lines converging from New England, Canada, and the West. On Monday last the New York, Boston and Northern Railroad was consolidated with the Harlem Extension, the new company being known as the New York, Boston and Montreal Railway Co. The northern portion of the Harlem Extension Railroad, extending from North Bennington to Rutland, has not yet been brought into the combination, but measures have been taken to effect that object, and with the acquisition of this branch, the New York, Boston and Montreal Railway will control an extensive system. The roads entering into the combination are the New York and Boston, the Putnam and Dutchess, the Dutchess and Columbia, the Pine Plains and Albany, and the Harlem Extension. The new line, therefore, affords a direct communication between New York and Rutland, Vt., where connecting roads make the communication with the Montreal complete. A running arrangement for 50 years between the New York and Boston and Erie railways, consummated some time ago, increases the efficiency of the combination, and insures the building of the Hudson River suspension bridge, which is necessary to enable the Erie to connect with the East without the employment of ferries. Both roads have agreed to assist in building the bridge, and work will probably be begun upon it at once. With the Gilbert and Vanderbilt roads both in hand, we will probably have quite as much "quick transit" as we need, and unexpectedly soon.

Those who have based their predictions of a magnificent future of the narrow gauge, on the success of the Festiniog line in Wales, will be pleased to learn that the gauge of that railway "is about to be much extended." We have the news on the authority of the London Times, which neglects to state what the new gauge will be.

Scientific and Technical Notes.

MM. Cumin and Martel have invented a process of

CASTING METALS IN VACUO, which promises to obviate one of the most serious difficulties experienced in casting by the ordinary method, i. e., the presence of air in the molds which is not expelled by the metal poured in, and which forms between the sides of the casting and the mold a thin envelope which prevents the metal from taking the exact shape of the mold and occasions air holes and other defects. Cumin and Martel's process is based upon the employment of a vacuum. At the moment of casting the mold is placed in communication with an air pump in such a manner that the air is drawn from the mold through the pores of the material of which it is made. The interior surface of the mold is, therefore, covered with a substance sufficiently porous to allow the air to pass, yet of ample resistance to guarantee perfection in form of the object cast. The material employed varies with the nature of the metal. 1. For those very easily fused, such as type metal, the inventors employ fine plaster, well dried. 2. For harder metals, such as bronze, they use plaster mixed in almost equal proportions with plumbago, alumina, and other substances of a similar nature, this mixture having been previously thoroughly dried, to drive off all the water from the plaster. 3. For more refractory metals, such as cast iron and steel, the sand mold is simply covered with plumbago, or other analogous materials.

M. Barreau, Jr., a civil engineer of Alexandria, has invented a new

TIDE MOTOR, by which he proposes to utilize the motion of the sea waves. He intends to raise the water of the sea above its level by the natural power of the waves, for which purpose a basin or reservoir of iron or masonry is to be constructed on the sea coast, and closed toward the sea by a sliding lock gate, the height of which is regulated according to the power of the waves. These meeting with the fixed obstacle, caused by the presence of the lock gates, rise along it, and fall over its crest into the reservoir. In order to facilitate the retaining of the sea water by the lock gate, the side walls of the reservoir, to the right and left of the gate are widened, forming thus a kind of funnel. The water accumulates thus in the reservoir at a level somewhat higher than that of the sea. The reservoir is closed at the land side by a second movable lock gate, which permits the water of the reservoir to act upon a water-wheel driving any machine. During the inactivity of this machine, the water-wheel is to store up power, either by compressing air or by raising water in a reserve basin.

Many years ago Fremy discovered, very unexpectedly at the time to the chemical world, that gum, instead of being, as previously held, an isomeric form of starch, or cellulose, was the lime salt of a peculiar acid, *gummic acid*. The *British Journal of Philosophy* states that, very curiously, gummic acid combines with ferric oxide, forming what may be called an

IRON GUM.

To coat paper, which is then sensitive to light, a solution of perchloride of iron is taken, ammonia cautiously added with agitation until a permanent precipitate makes its appearance. The liquor is then filtered, paper saturated with the solution, and allowed to dry in the dark. The coated sheets are then floated on some thick mucilage of gum-arabic. The surface of the paper is thus covered with an even layer of the "gummate of iron." When the paper carrying the iron is first coated with the mucilage, the color does not at once change, but presently a strong, yellowish-brown tint is produced, and the gum "sets," and then the layer dries up, leaving the paper very flexible for a long time, and highly glazed.

Capt. John Gonkin has lately found, in the Tecoma mine, near Buel City, Nevada, some specimens of a very rare mineral known as

MOLYBDATE OF LEAD,

concerning which Mr. J. S. Phillips, M. E., of San Francisco, writes as follows: It has been found of various colors, from orange yellow to aurora red, and from wax yellow to gray and brown; these samples are, for the greater part, bright amber yellow, certain portions being changed by oxide of iron, to snuff color; the amber parts are crystallized either into irregular tables, which lie at all angles, or as very flat, four-sided prisms, of strictly lamellar structure, which may be cloven with the greatest ease, parallel to their base, to thin scales, whilst the whole stone is so soft and friable that it may be crumbled between the fingers more like an artificial drug than a natural mineral. When heated, it first decrepitates into very numerous thin scales, which, on increase of heat, becomes of a dark, wax yellow, (returning as before to pale amber yellow when cold) on the temperature being still further increased it fuses into a light sulphur yellow mass. Fluxed with carbonate of soda it may be smelted on charcoal, in the blow-pipe's yellow flame, when about half its weight of lead will be reduced to one or more buttons, whilst the molybdic acid will pass into the coal. This is similar to tungstic acid, with the difference, that after the removal of the lead, the molybdenum may be oxidized before the blue flame, to coat the surface with its copper colored oxide. When fused with carbonate of soda in platinum wire, it forms a limpid molten glass, which becomes milk white when cold. This bead when fused on charcoal in or before the blow-pipe's flame, passes into the coal and the red oxide may be made to reappear, as best seen by a lens. Fused with borax in platinum wire before the point of the blue flame, the resultant glass is dark yellow when hot, and of beautiful opaline appearance when cold; but when an excessive quantity is added, the glass when hot is dark red, then yellow, and when quite cold, a bluish gray opal. The manner in which this opaline appearance closes in from the wire to the center of bead, during the cooling, is very characteristic. Merlet's moist method may also be resorted to for the detection of molybdic acid in this mineral, as follows: Fuse the powdered sample with nitre in a platinum spoon or crucible, then dissolve the molybdate of potash thus formed, in water boiled over a spirit lamp (or hot stove), filter or pour the clear liquor into a porcelain dish (or saucer), then, after placing a small piece of bright copper therein, add to the boiling solution just sufficient hydrochloric acid to dissolve some of the copper, which will form a general light green solution, and after some time (if molybdic acid is present) just immediately over and around the metallic copper, its characteristic indigo blue.

General Haupt's

IMPROVED ROCK-DRILL,

as adopted by McKean & Co., of Paris, is now attracting the attention of mining engineers. It consists of but few parts, all of which are well designed for compactness and strength; and, there being no undue strain upon any part, it is scarcely possible for it to break down, which has been the common failing with rock-boring machinery. It can be adjusted to any required position, so that holes can be drilled at any angle, the machine working with equal facility in every direction. Its moving parts are only two—the piston and piston-rod, with cutter-bar, and the valve. It is manipulated with the greatest ease, and it is inexpensive. Moreover, as there is no shock whatever upon any part of the machine except the cutter-bar and piston, which is cushioned

by the steam or air in the cylinder, the wear is reduced to a minimum. For driving tunnels where one or more machines may be worked against the face, the machines are mounted upon movable and adjustable columns, supported upon a carriage moved upon rails. The smallest size of machine will drill holes of any ordinarily required diameter, and any number of blows, up to one thousand per minute, may be given. The force of the blow can be made more or less, at pleasure, by the simple turning of a screw in connection with the valve gear. The whole force of the blow comes upon the solid piston carrying the boring-tool, to which it is readily and firmly secured by a very simple and ingenious device. The steam or compressed air operates upon the piston in such a manner as to keep it working in suspension, the valve ports opening and closing so as to give the steam or compressed air its effective force, and forming a cushion at either end of the piston in its reciprocating movement. The tool is forced to rotate regularly in one direction, and the rotation is made to occur during the backward stroke of the piston. For sinking shafts the machine is mounted on a column placed cross-wise in the shaft, from which column any required direction may be readily given to the boring tool.

Chambers' Journal publishes the following with regard to a

NEW AND IMPORTANT INVENTION IN TELEGRAPHY.

When Sir William Thomson invented his reflecting galvanometer, and showed its usefulness for telegraphic purposes, he insured the success of under-sea cables, whatever their length. With this instrument, the movements of the little reflector enable the clerk to read off the message by careful watching. But recently, Sir William Thomson has invented an instrument—the patent siphon recorder—which, as its name indicates, writes or records the message, as received, on a strip of paper. It is an essential condition of such an instrument that it shall be very light; and the siphon, in this case, made of capillary tubing, is not thicker than a horse hair. Indeed, so small is the bore, that the ink will not flow therein of itself, but squirts out when electrified. The siphon is connected with a coil of copper wire, an electro-magnet, and an ebonite desk, armed with pieces of soft iron, which, being attracted by the magnet, is kept rotating, and regulates the current flowing from the battery and cable. Acted on by this current, the ink, as already stated, squirts from the siphon, and writes a succession of dots and dashes, which represent the letters of the alphabet. To an unaccustomed eye the writing is a confused, unmeaning scribble; but a good telegraph clerk will read it off as if it were ordinary writing. Thus a message will now, so to speak, deliver itself from the other side of the ocean, thousands of miles distant, and telegraphy has achieved another triumph.

NICKEL AS A GAS OCCLUDER.

Prof. Raoult, of Grenoble, has proved that nickel employed for twelve hours as a negative electrode in a voltameter, condenses at least 150 times its volume of hydrogen, and abandons entirely this gas, when it is taken from the voltameter and plunged in water. M. Raoult has made several experiments on the production of caloric, and has succeeded in demonstrating that the intensity of the heat developed by an electric current is independent of the system of battery by which the current is engendered.

Mr. T. B. Tighman, the ingenious inventor of the sand blast process of carving glass, marble, etc., has devised a

NEW PROCESS OF CUTTING STONE.

He substitutes for the sand, which is usually used for feeding the saws by the usual mode of sawing stone, small size cast iron shot. This shot is made by the usual process of making lead shot, viz.: dropping the molten metal from a great elevation or higher tower. Some idea of the great value of this invention may be formed from the fact (vouched for by one of the largest marble dealers in Philadelphia), that a block of granite that took three days to saw by the old mode took but one hour by the new process. The iron shot are much cheaper than the black diamonds used in the diamond saw, and are said to be quite as effective.

The Chinese Sensation at Beaver Falls.—A correspondent of the Pittsburgh Commercial writes to that journal as follows:

The first introduction of Chinamen, in June last, was the cause of much comment and distrust, which has not been lessened by the second and the third invoice of the same article. It is evident that somewhat of a panic has seized the people, and holders of property purchased from the agents of the Harmony Society, upon which a part has been paid, are from necessity anxious about the result. Real estate is inactive, everybody from abroad partaking of the general feeling of fear regarding the future of the place. Chinamen are not averse to material prosperity to the masses, however profitable they may prove themselves to be to their employers. A large number of the laboring people who were employed in our manufactories have sought homes and employment elsewhere; some because they were compelled to do so; others, thinking that the employment of Chinese presaged an ultimate revolution in labor and wages, left before a final crash should come. Extreme opinions are formed, and harsh things are said, which, east abroad, only add to the danger which would be averted. A fresh arrival to-day of Celestials will not tend to the allaying of fears, so long felt, of the ultimate result of the project. The new invoice is not a large one, but it is an adding to the number of unwelcome citizens, if citizens they may be termed. If they shall prove a success in the works of the cutlery company, it is not unlikely other manufacturers may be induced to employ them, as men will always seek self-interest.

OUR RAILROAD SYSTEM.

Relation of Mileage Completed Dec. 31st, 1872, to Area, Population and Value.

STATES AND TERRITORIES.	Rail-roads in use.	Area of States, &c.	Population and valuation of property by census of 1870.		One mile of Railroad to	
			Area.	Pop. and Value.	Area.	Pop. and Value.
States.	miles.	sq. m.	pop.	Value.	sq. m.	No. Value.
Alabama.....	1,830	50,722	996,992	\$125,592,595	37.1	\$41,601
Arkansas.....	670	34,198	484,471	64,598,848	76.8	713.6
California.....	1,532	158,981	560,847	269,644,066	116.2	308.1
Connecticut.....	907	4,674	557,451	425,433,387	5.1	692.6
Delaware.....	231	2,120	121,015	64,707,393	9.9	209.4
Florida.....	467	59,268	187,748	32,480,843	137.0	402.0
Georgia.....	2,317	58,000	1,184,109	297,219,519	20.2	102,489
Illinois.....	6,901	55,410	2,539,891	422,890,515	8.3	268.2
Indiana.....	3,829	33,899	1,680,637	663,455,044	8.8	439.9
Iowa.....	3,679	55,045	1,191,799	302,518,418	14.9	82,800
Kansas.....	2,117	81,818	364,399	92,125,861	38.4	43,612
Kentucky.....	1,173	37,600	1,321,011	409,544,394	17.8	168,781
Louisiana.....	928	41,846	738,915	253,371,580	72.8	1,270.8
Maine.....	31,776	636,915	204,233,780	34.6	677.4	
Maryland.....	861	11,184	780,894	423,894,918	13.0	905.7
Massachusetts.....	1,643	7,800	1,437,351	1,591,968,112	4.7	887.0
Michigan.....	2,997	54,451	1,184,089	373,242,917	18.9	895.1
Minnesota.....	1,855	88,531	439,706	44,135,332	30.4	87.0
Mississippi.....	989	47,156	897,922	177,378,890	47.7	837.4
Missouri.....	2,977	65,350	1,791,295	556,139,069	21.9	186,808
Nebraska.....	1,192	75,995	129,993	15,584,616	63.7	45,792
Nevada.....	932	112,000	42,491	25,740,973	136.2	70.6
New Hampshire.....	931	9,280	318,300	149,985,390	9.9	341.3
New Jersey.....	1,379	8,320	906,006	694,668,971	6.0	657.1
New York.....	4,901	47,000	4,382,759	1,967,001,185	9.5	894.3
North Carolina.....	1,710	50,704	1,071,561	130,378,622	28.6	814.1
Ohio.....	3,963	39,964	2,623,999	1,167,731,697	10.1	204,753
Oregon.....	294	95,244	90,983	31,735,510	319.6	106,705
Pennsylvania.....	5,787	46,006	3,321,791	1,319,238,043	7.9	606.6
Rhode Island.....	139	1,306	217,353	244,378,854	9.4	1,569.7
South Carolina.....	1,231	29,285	703,066	183,915,327	22.3	535.9
Tennessee.....	1,582	45,000	1,338,580	253,728,161	28.4	735.5
Texas.....	1,931	237,504	818,579	149,732,929	182.6	629.2
Vermont.....	764	10,212	330,551	102,548,538	13.4	428.6
Virginia.....	1,516	40,904	1,225,163	365,439,917	26.9	809.1
West Virginia.....	312	23,000	142,014	140,538,273	45.0	863.1
Wisconsin.....	2,219	38,924	1,054,070	335,308,828	24.8	476.2
Total States.....	68,095	1,950,171	38,118,253	\$14,021,297,071	23.6	\$207.7
Territories.....						
Arizona.....		119,916	9,658	1,410,395		
Colorado.....	557	104,500	39,964	17,338,101	188.1	71.6
Dakota.....	323	147,410	11,811	2,924,469	456.6	44.0
District of Columbia.....		60	131,700	74,271,695		
Idaho.....		90,932	14,999	5,292,305		
Montana.....		143,776	20,595	9,948,411		
New Mexico.....		120,301	91,474	17,794,014		
Utah.....	381	80,051	86,796	12,362,842	210.1	92.8
Washington.....	65	69,994	23,955	10,642,863	1,272.6	435.6
Wyoming.....	454	93,107	9,119	5,516,748	305.1	13,151
Total Territories.....	1,770	965,032	442,730	157,698,661	515.2	250.1
"Indian Country".....	313	187,171	110,000	125,000,000	838.0	316.3
Total United States.....	70,173	3,102,374	38,650,983	\$14,213,486,732	442.1	\$208

* Included in Maryland. † Estimated.

COMPARISON OF AMERICAN AND FOREIGN RAILROAD SYSTEMS.

	Railroad miles.	Population.	Area sq. miles.	Inhabitants per sq. m.	Sq. m. to RR.
United States.....	69,158	38,555,983	3,962,879	14	43
Germany.....	12,307	40,111,265	319,061	129	17
Austria.....	10,333	35,943,592	272,254	131	40
France.....	10,333	35,943,592	201,000	181	19
Russia in Europe.....	7,014	71,307,794	1,992,574	36	294
Great Britain.....	15,537	31,817,794	130,769	265	8
Belgium.....	1,801	4,539,064	11,412	399	18
Netherlands.....	820	3,828,035	19,464	197	15
Switzerland.....	820	2,669,095	15,233	175	18
Italy.....	3,667	26,373,776	107,961	225	29
Denmark.....	430	1,784,741	14,553	111	34
Spain.....	3,401	16,301,580	182,758	90	54
Portugal.....	453	3,367,867	36,510	92	81
Sweden and Norway.....	1,049	5,890,132	188,771	19	180
Greece.....	103	1,332,508	19,941	71	199

Meeting of the Western and Southern Railroad Association.

The Western and Southern Railroad Association met at the Southern Hotel, St. Louis, on January 17. Hon. Thomas Allen, President, was in the chair, and Mr. H. E. Sharpe, acted as Secretary. The railroads represented, were the Hannibal and St. Joseph, the Kansas Pacific, St. Louis, Kansas City and Northern, Vandallia, Illinois Central, Chicago and Alton, St. Louis and Iron Mountain, Mobile and Ohio, Cairo and Fulton, Southeastern, Gilman, Clinton and Springfield, Fort Wayne, Jackson and Saginaw, Elizabethtown and Paducah. The officers elected for the year 1873, were as follows:

President—Hon. Thomas Allen, President Iron Mountain Railroad.
Vice-President—Albert Fink, of the Louisville and Nashville Railroad.
Secretary and Treasurer—Charles Payne, of the Lake Shore and Michigan Southern Railroad.
Corresponding Secretary—H. E. Sharpe.
Executive Committee—L. J. Fleming, Mobile & Ohio R. R.; J. C. McMullen, Chicago & Alton; Edwin S. Bowen, Kansas Pacific; W. K. Muir, Supt. G. W., of Canada; Horace Scott, Jeff. Madison & Indianapolis.

On motion the title of the association was changed to The Railway Association of America. It was voted to hold the meetings hereafter twice a year, instead of annually, the time fixed for the regular meetings, the second Wednesday in May and October. The next meeting of the Association will be held on the 14th day of May, at the St. Nicholas Hotel, New York. Reports were read by the secretary from several committees, on the following subjects: "National Time" or uniform system of time for railroads. "A National Telegraph."

On account of the change of name of the Association and the intention to take in members of Eastern roads, action on the report was postponed till the May meeting.

National Association of Agricultural Implement Manufacturers.

The National Association of Agricultural Implement Manufacturers met at Cleveland, Ohio, on the 14th inst. Members were present from most of the Northern States. The corresponding secretary presented numerous encouraging letters from manufacturers in response to the address sent them from the October meeting of the association. Resolutions were passed to shorten credits, reduce discounts on commissions to dealers and agents, and fixing penalties for cutting into prices. A committee was appointed to memorialize legislatures on the subjects of lower freight and express tariffs on implements, and asking for laws to avoid locking up the money in county treasuries that is so much needed in business channels. The secretary announced large accessions of members since the October meeting. The association adjourned, to meet at Cleveland, on the third Tuesday in April.

Prof. Wm. C. Cleveland, head of the department of civil engineering in the Cornell University, died on the 16th inst., at his residence in Ithaca, N. Y. Prof. Cleveland was graduated at the Lawrence Scientific Institute of Cambridge, Mass., where he resided and practiced his profession up to the time of being

called to the place he occupied at the time of his death. His rare talents and knowledge in his profession attracted the attention of the university authorities at the beginning of selecting the faculty. Previous to this time he had never taught, but his connection with the university has been successful in the extreme. He was an ardent lover of art, and the best influences of its study were stamped upon his daily life, and made him one of the pleasantest of men to associate with students, and to exert a refining influence upon them. The loss of a man of so thorough knowledge in his profession is a severe blow to Cornell, and will be deeply felt.

The Precious Metals—Product in 1872.—The San Francisco Alta gives the following statement of precious metals produced during 1872 in the gold and silver bearing districts west of the Missouri river, furnished by the general superintendent of Wells, Fargo & Co.'s Express:

California.....	\$19,040,098 24
Nevada.....	25,548,872 00
Oregon.....	1,905,034 02
Washington.....	236,051 06
Idaho.....	2,514,089 78
Montana.....	4,442,134 90
Utah.....	3,521,020 09
Arizona.....	143,777 00
Colorado.....	3,001,750 85
Mexico (west coast).....	535,071 80
British Columbia.....	1,350,064 16

Grand total.....\$62,236,913 89

The product for the year, \$62,236,913.89, is \$3,952,884.23 in excess of 1871, which was \$58,284,029.66. The increase is confined to Utah and Nevada alone, some of the other localities falling off slightly. It is proper to state that our express communication is so limited, and knowledge so imperfect of Arizona, that we do not consider the figures given for that Territory as reliable for the product of that section.

An organization, composed of some of the most prominent merchants and business men of St. Louis, styling themselves the St. Louis International Industrial Exposition, was formed on Saturday evening. The objects of the organization are to develop industry, enlarge commerce, and to make known the relative standing of St. Louis among the cities of the world, and the progress it is making in the march of civilization. The capital stock of the organization is over \$1,000,000. It is the intention to hold an exposition some time during the coming fall.

A writer in the Chicago Railway Review says: During the present year there are likely to be five competing coal and iron ports on Lake Erie, all within a limit of a little more than 100 miles. Erie, Pa., has built two coal roads; Ashtabula, 30 miles west, has one in operation to the Mahoning coal fields, and another nearly completed; Fairport, 60 miles west, has the Youngstown road through Painesville almost done; while Cleveland, 90 miles west, is already doing a large business in coal and iron by means of her present railway connection with the coal fields south, and the Tuscarawas Valley Road, built largely by Cleveland capital and enterprise, has been carried west

Trade Report.

Office of The Iron Age,
Wednesday Evening, Jan. 23, 1873.

The principal topic of discussion during the week has been the bill introduced by Senator Sherman, on Thursday last, looking to the resumption of specie payments. As chairman of the Finance Committee, Senator Sherman is supposed to represent the views of the administration, and as his bill is likely to take precedence over all other financial measures, it has been more carefully examined and more fully criticized than any other bill introduced during the present session. The first section of this bill, which embodies all its essential provisions, provides as follows:

That on the 1st day of January, 1873, the Secretary of the Treasury is authorized and required to pay on demand, at the office of the Assistant Treasurer, in the city of New York, to any holder of United States notes to the amount of \$1000, or any multiple thereof, in exchange for such notes, an equal amount of the gold coin of the United States; or, in lieu of coin, he may at his option issue, in exchange for said notes, an equal amount of coupon or registered bonds of the United States, in such form as he may prescribe, and of denomination of \$50, or some multiple of that sum, redeemable in coin of the present standard value, at the pleasure of the United States, after ten years from the date of their issue, and bearing interest, payable quarterly in such coin, at the rate of five per centum per annum; and the Secretary of the Treasury may release the United States notes so received, or if they are cancelled, may issue United States notes to the same amount, either to purchase or redeem the public debt or meet the current payments for the public services; and the said bonds and the interest thereon shall be exempt from the payment of all taxes or duties of the United States, as well as from taxation in any form by or under state, municipal or local authority; and the said bonds shall have set forth and expressed upon their face the above specified conditions, and shall, with their coupons, be made payable at the Treasury of the United States.

So far as we can judge, this bill meets with general approval in business circles, although it has called out a good deal of factious, and not in every instance intelligent, newspaper criticism. We have no space in this issue to discuss the bill at length, but as a whole it seems to us a well considered measure, framed with due regard for the commercial interests of the country and will calculated to restore the national finances to a specie basis without violent shocks of any kind and without affording speculators an opportunity to profit by movements calculated to weaken the gold reserves of the Treasury.

The past week has been an uneventful one in Wall street. The money market has worked easily at 6 @ 7 per cent. on call and 8 @ 10 per cent. for prime endorsed commercial paper. The banks report considerable accessions of currency, especially legal tenders, as will be seen from the statement of aggregate averages given below. All indications are favorable for the immediate future, and the condition of the foreign markets warrants the prediction of continued ease in money.

The gold market has been strong, partly from natural causes and partly the result of speculative combinations among operators to advance the premium. The following will show the range of daily quotations:

	Highest.	Lowest.
Thursday	112 1/2	112 1/2
Friday	112 1/2	112 1/2
Saturday	112 1/2	112 1/2
Sunday	112 1/2	112 1/2
Tuesday	112 1/2	112 1/2
Wednesday	112 1/2	112 1/2

The market for stocks was dull and steady during the latter part of last week, but remained steady. On Monday it became strong and active. The principal dealings have been in New York Central, Harlem, Wabash, Erie, Western Union, Pacific Mail, Ohio, C. C. and I. C. and Lake Shore. The highest and lowest of to-day's quotations are given below.

The bank statement is favorable, the banks now holding \$3,499,100 in lawful money above the 25 per cent. requirement, which is a gain of \$309,075 over last week. The statement reflects the return of currency to this center. The following is a comparison of the bank averages for the past two weeks:

	Jan. 11.	Jan. 18.	Differences.
Loans	\$275,532,800	\$278,309,600	Inc. \$2,776,800
Specie	22,539,100	21,110,970	Dec. 1,428,130
Circulation	27,401,000	27,542,200	Inc. \$141,200
Deposits	307,441,500	219,588,300	Inc. 87,853,200
Legal Ten.	40,876,700	44,430,900	Inc. 3,554,200

The movements in foreign trade for the week are shown by the following tables:

	1871.	1872.	1873.
For the week	\$4,607,751	\$4,006,015	\$1,536,333
Pre. reported	8,961,936	5,091,162	7,968,329

Since Jan. 1... \$13,509,658 \$9,415,177 \$12,554,662

	1871.	1872.	1873.
Total for the week	\$328,155	\$328,155	\$328,155
Previously reported	2,095,233	2,095,233	2,095,233

Total since January 1, 1873... \$3,023,388

	1871.	1872.	1873.
Tot. for week	\$3,590,481	\$2,134,783	\$11,382,162
Prev. reported	\$5,640,792	\$6,549,301	\$5,348,100

Since Jan. 1... \$11,331,336 \$12,381,039 \$16,630,368

Included in the imports of general merchandise for the week are:

Avails	320	\$2,405
Brass rods	42	2,747
Bronzes	15	2,608
Chains and anchors	172	8,715
Copper	125	50,756
Cutlery	135	53,552
Gas fixtures	2	2,590
Gunns	92	4,079
Hardware	53	4,380
Iron, pig, tons	2,008	60,653
H. H. bars	9,514	145,309
Iron, cotton ties	407	1,234
Iron tubes	400	1,573
Iron, other, tons	1,073	42,882
Lead, pigs	10,432	63,254
Lead, tons	34	3,176
Metal goods	40	35,132
Nails	12	443
Needles	21	8,057
Old metal	6,901	2,362
Old cotton ties	34	6,504
Per. caps	11	1,909
Saddlery	4,574	64,459
Steel	2,534,345	534,345
Spelter	2	1,276
Silver ware	100	1,000
Tin, boxes	11,091	124,166
Tin, 907 shabs	10,442	11,335

Foreign exchange is quoted as follows:

	60 DAYS.	3 MONTHS.
Prime bankers' sterling	100% @ 109 1/2	110% @ 110 1/2
Good bankers' do.	100% @ 109 1/2	110% @ 110 1/2
Prime bankers' do.	100% @ 109 1/2	110% @ 110 1/2
Paris (bankers)	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Amsterdam	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Swiss	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Antwerp	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Hamburg	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Frankfort	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Bremen	5 1/2 @ 23 1/2	5 1/2 @ 23 1/2
Prussian thalers	7 1/2 @ 73 1/2	7 1/2 @ 73 1/2

Government bonds at the close were strong. We quote:

	Bid.	Asked.
U. S. Currency 6s	113 1/2	114 1/2
U. S. 6s, 1881, reg.	113 1/2	114 1/2
U. S. 6s, 1881, c.	113 1/2	114 1/2
U. S. 6s, 5-20 reg. May and Nov.	113 1/2	114 1/2
U. S. 6s, 1882, c.	113 1/2	114 1/2
U. S. 5-20 1884, c.	113 1/2	114 1/2
U. S. 5-20 1885, c.	113 1/2	114 1/2
U. S. 5-20 1887, r. Jan. and July.	113 1/2	114 1/2
U. S. 5-20 1888, c. Jan. and July.	113 1/2	114 1/2
U. S. 5-20 c. 1887	113 1/2	114 1/2
U. S. 5-20 c. 1888	113 1/2	114 1/2
U. S. 10-40 reg.	113 1/2	114 1/2
U. S. 10-40 c.	113 1/2	114 1/2
U. S. 5s of 1881, reg.	113 1/2	114 1/2
U. S. 5s of 1881, c.	113 1/2	114 1/2
Central Pacific Gold Bonds	99 1/2	100 1/2

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	105 1/2	104 1/2
Lake Shore	93 1/2	93 1/2
Rock Island	113 1/2	112 1/2
Wabash	71 1/2	71 1/2
Western Union Telegraph	64 1/2	64 1/2
Milwaukee & St. Paul	52 1/2	52 1/2
Milwaukee & St. Paul preferred	77 1/2	77 1/2
Pacific Mail	73 1/2	71 1/2
Ohio & Erie	65 1/2	65 1/2
Chicago & North Western	47 1/2	47 1/2
Boston, Hartford & Erie	8 1/2	8 1/2
Union Pacific	36 1/2	36 1/2
C. C. & I. C.	38 1/2	38 1/2
Quicksilver	48 1/2	48 1/2
U. S. Express	79 1/2	79 1/2

GENERAL HARDWARE.

The demand is not large, nor is much business to be looked for till the large manufacturers of general goods get out their new price lists and discount sheets. Russell & Erwin Mfg. Co. and Sargent & Co. have theirs in press and will issue them in a few days. The Hart, Bliven & Mead Mfg. Co. have to-day changed the price of Sockets as follows: Silvered Plain, Extra Heavy Straight, Silvered Ball, and Philadelphia Ball Shaft Sockets, discount 15 and 5, instead of 5 and 5 per cent.; Plain, Acorn, and Flange Pole, and Central Park Pole, Yoke Sockets, discount 10 and 5, instead of 5 and 5 per cent. heretofore. J. & Riley Carr announce that they have advanced the price of their extra heavy "Cast Steel" Horse Raps 5 per cent. Files remain unchanged. Carriage Bolts are firmer. We quote Common discount 60 and 5 per cent., although large lots can be bought at a good deal better. There is a marked improvement in the demand for Nails, and the card rate, viz., \$5 for 10d. to 60d., with the usual discount of 15 cents per keg on lots of 100, and 20 cents per keg on lots of 1000 kegs, is fully maintained.

The makers of Casters have agreed upon a uniform list and discounts. The following are the new list prices (as furnished us by Sargent & Co.), from which a discount of 20 and 10 per cent., cash, is taken by all makers:

PLATE CASTERS.	
All Iron.	
No. 10	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 11	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 12	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 13	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 14	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 15	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 16	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 17	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 18	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 19	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 20	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 21	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 22	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 23	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 24	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 25	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 26	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 27	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 28	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 29	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 30	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 31	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 32	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 33	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 34	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 35	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 36	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 37	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 38	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 39	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 40	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 41	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 42	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 43	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 44	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 45	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 46	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 47	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 48	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 49	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 50	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 51	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 52	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 53	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 54	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 55	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 56	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 57	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 58	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 59	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 60	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 61	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 62	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 63	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 64	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 65	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 66	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 67	1 1/2 2 3 4 5 6 7
Per set	10c 11c 12c 13c 14c 15c 16c 17c
No. 68	1 1/2 2 3 4 5 6 7

Scrap, copper, bldg. 20
Lead, pos. 007; pig 10-000; bldg. 20

OUR ENGLISH LETTER.

Review of the British Iron, Steel and Coal Trades.

(From our Regular Correspondent.)

SHEFFIELD, Dec. 31, 1872.

On this, the last day of the dying year, labor seems to have run riot and to have thrown down the gauntlet to the giant, capital. From almost every quarter of this "nice little, tight little" island reports come to hand chronicling strikes and wages disputes. First and foremost on the list must be placed the threatened strike in South Wales, which affects no less than 70,000 men, or, with their families, no less than 350,000. This total is composed as follows, of the large iron works who insist upon the 10 per cent. reduction, or will close their works: Dowlais, 10,000; Cyfarthfa, 5,000; Plymouth, 5,000; Aberdare, 4,000; Blaenavon, 5,000; Haughty & Blania, 5,000; Ebbw Vale, 10,000; Tredegar, 5,000; Rhymney, 4,500; Cromman, 4,000, and Brodgen & Co., 4,000, making, with 9,000 house coal miners, about 70,000 men. Of his total about 20,000 are colliers and miners, and the remainder iron workers. Last Monday a meeting of delegates representing the men was held at Merthyr, when it was resolved not to submit to the reduction proposed by the employers. The meeting was afterward addressed by Mr. Mundella, M. P., on the advantages of arbitration. After that gentleman's address the men resolved to withdraw the notice they had given for an advance, and decided, "in the interests of peace and conciliation," to submit the question to a council for arbitration, to be composed equally of employers and workmen. On the other hand, the masters refuse to have anything to do with arbitration, and met at Cardiff, on Friday, to consider what course they should pursue. Mr. Fothergill, M. P., of Plymouth Works, presided, and the works represented were Dowlais, Abermang, Cyfarthfa, Ebbw Vale, Rhymney, Aberavon, etc. A three hours' discussion ensued, the result being to confirm the previous resolution to reduce wages 10 per cent. up to the end of March, at any rate, when, if the state of trade warrants such a step, an advance will be given. A further conference in the matter is being held to-day, but the result has not yet transpired. In the meantime the workmen have been out at Merthyr and Dowlais since Saturday, pending the result of to-day's negotiations. Next on the formidable list is the colliers' strike in Scotland, which has been alluded to in my former communications, and which is now causing not only the greatest inconvenience, but a positive coal famine in the district. The men positively declare that they will not resume work under 10 a day, but, nevertheless, are willing to meet the masters in arbitration. Along the whole route of the Caledonian Railway, from Glasgow to Carlisle, comprising the chief coal district of Scotland, the supply of that mineral is pretty nearly nil, and, except near Coatbridge, none of the pits are being worked. Many of the blast furnaces have been run out, and, generally speaking, matters look very unfavorable indeed. Poor people are necessarily greatly inconvenienced thereby, no less than 1/6 to 1/8 per hundred weight being realized at Motherwell. This disastrous result ensues from the waywardness of the miners, who have broken loose from Mr. McDonald, their recognized leader, and are following the foolish lead of a man named Malcolm, under whose approving eyes intimidation, on a most extensive scale and of a most unblushing nature, is being practiced. In all probability serious rioting or complicated legal proceedings will shortly result. In the Dumbarton district, the iron makers have been promised a reduction of their hours to 51 weekly, thus averting a general strike. At Johnstone (Scotland), Messrs. Merry & Cunningham have advanced their iron stone, and shale miners wages 1/6 per day. In the Fife district, the miners are well at work, but on and after January 1st will only work four days per week, so as to have a controlling power over their own hands. In the Wigan district (Lancashire), the coal masters have resolved that the pay shall take place fortnightly, on the Friday evening, and the Saturday following, it shall be the fortnightly "pay day" instead of Monday as at present. What a befitting individual a miner is in this country! Happy men to have a fortnightly play day, beside a couple of Sunday's, 10 a day and other advantages! In the Wolverhampton, Wednesbury, Tipton, and other Staffordshire, &c., localities, the iron workers and their employers are busy and anxiously conferring on the wages question, and will, I think, be able to come to an amicable understanding. These examples will give some tangible idea of the troublesome nature of the workers, and of the many difficulties existing here in the face of six months undisturbed working. At Newcastle, an association is being formed, under the Industrial Societies Act, entitled "The Co-operative Mining Society, Limited," for the purpose indicated in its title. A large capital will be raised, but no member will be allowed to hold more than £200 worth of shares. After paying 10 per cent., a reserve fund will be set aside, and the remainder divided. In connection with this scheme, it is stated that the output of coal last year was 120,000,000 tons, and the average increase of price 7/6 per ton, which would be equal to £45,000,000. The promoters of the society agree that labor only received £15,000,000 of this sum, leaving the nice little sum of £30,000,000 as a lining for the pockets of the employers. It is stated that this undertaking is being promoted in earnest, and will doubtless prove a success. At Sheffield, the steel manufacturers are trying, by a side issue, to bring the coal masters to their senses. As usual, they close at Christmas for stock taking, but instead of only shutting up for a few days, they intend to let the works remain idle until about January 14. The Bessemer steel departments are, however, necessarily an exception to this, some of the leading firms being so exceedingly busy that the Bessemer converters were set at work again on the day following Christmas day. Before the date I have just named arrives, another meeting of the Steel Manufacturers' Association will have been held, and a decided course of action resolved upon. Speaking of January 14th reminds me that on this date the annual Trades Union Congress meets at Leeds, with this programme: 1. Examination of credentials, election of officers, and chairman's opening address. 2. Legislative action: report of parliamentary committee on mines regulation bill,

arbitration bill, compensation bill, truck bill, factory nine hours bill, the criminal law amendment act, and the standing orders for future congresses. 3. Future legislation: criminal law amendment act, truck bill, factory hours bill, compensation bill. 4. Questions for papers and discussion: trade societies—their necessity, objects and usefulness; trade councils—their necessity and utility. 5. Reduction of the hours of labor; limitation of over time; apprenticeships; piecework, as it affects workmen, employers and the public. 6. Foreign competition, and the introduction of foreign labor; their effects on British industry; emigration and unemployed labor; convict labor, as it affects certain trades in this country. 7. Co-operation and industrial partnerships. 8. Representation of labor in parliament—the best means to secure it. 9. How can the surplus funds of trade societies be best utilized for general benefits; trades' halls, their adaptability and advisability for the purposes of trade societies. 10. The application of arbitration and conciliation in trades disputes. 11. The necessity of providing a sufficient staff of efficient and practical inspectors to enforce the factory and workshops regulation acts. 12. Friendly societies, and probable legislation thereon, as a result of the Friendly Society Commission. 13. The employment of women and children in agriculture, factories and workshops; and the employment of soldiers in industrial trades and agricultural labor. The conference will, it is understood, be the most important ever held in this country. I shall have to recur to the subject at a future time.

The price of coal is not diminished, nor is it likely to be. In all the principal coal producing districts the demand is stated to be greatly in excess of the supply, partly on account of the activity of the iron, steel and hardware trades, and partly owing to the limitations of the output exercised by the colliers themselves in order to keep up their wages. During the month of November 962,533 tons of coal were exported, as against 1,053,402 tons in November, 1871—a decrease of 90,000 tons. From the Northern ports 448,909 tons were sent; Yorkshire, 79,770 tons; London, 44,377 tons; Liverpool, 69,350 tons; Severn ports (Wales, Worcestershire, &c.), 27,756 tons; and from Scotch ports, 22,870 tons. It may be noted as an interesting fact, that from January to November 11,321,808 tons of coal were exported from Great Britain. Since last week's letter prices have continued to go steadily upward. The production of Scotch iron during 1872 is less by something like 100,000 tons than during 1870, and by 60,000 as compared with 1871, the exports being, roughly speaking, about 40,000 tons less than in 1871, despite which, the exports and home consumption have exceeded the production by about 400,000 tons. The stocks now in Connal's stores are 109,000 in the Firth & Clyde Canal Co.'s stores, and at makers' works 120,000 tons, the total, 229,000, being 438,000 tons smaller than at the close of 1870, and 261,000 less than at the end of last year. This "burning the candle at both ends" will not pay much longer. Some people in Glasgow have been making enormous fortunes, and fears are, in some strictly business quarters, being entertained lest in the general and fierce struggle between speculators, ironmasters, colliers and miners, trade should be irretrievably ruined. These fears are not altogether devoid of foundation. The rates given by me last week for Gartsherrie, Coltness, and other leading makers of Scotch Pig may still be taken as correct, no legitimate advance upon those figures being current as yet. The same remark is equally applicable to the pig iron rates throughout the Welsh, Cleveland and Staffordshire districts. The finished iron prices remain very firm. Earl Dudley, Messrs. Burrows, Messrs. Baldwin (Stourport), and other leading makers having issued circulars intimating that prices—notably for sheets—will now be subject to negotiation—that is, the list prices cannot be taken for granted. In Yorkshire, a steady trade is doing in all kinds of finished iron bars, realizing £12. 10. Ralls at Middlesboro' fetch £11, and other descriptions are proportionately firm. In connection with the Cleveland iron trade, in which Middlesboro' naturally takes the lead, I cannot do other than notice a most interesting retrospective review of that locality for twenty years past, which has just been published in the Newcastle Chronicle, and which I send you in its entirety—commencing with the first blast furnace which was put up in 1852 by B. & V. Vaughan, at Middlesboro'. The article brings the subject down to the present time, when there are 130 blast furnaces in the district, with 20 others in course of erection. When these are blown in Cleveland will positively have more furnaces than Scotland. The pig iron made during 1872 in Cleveland was about 2,000,000 tons, which, at 45 per ton, furnishes a total value of £10,000,000. Next year the North of England alone will probably produce not less than 3,000,000 tons of pig, or equal to the total make of the country in 1854. Other districts—Wales, Staffordshire, Barrow in Furness—have not been idle, but I think no other town in the Kingdom can boast of such rapid progress as Middlesboro'. Were I asked to name the three most growing towns in Great Britain, I should unhesitatingly say, Sheffield, Barrow and Middlesboro', all of which are, by a rapid process of accretion, increasing amazingly in bulk and population. The Western Mail, Cardiff, Sheffield Independent and other local papers, have this week devoted some space to reviews of the iron trade of their respective localities, but as I have some extent treated their figures and, in addition, have not space to go into matters more fully, I cannot recapitulate their articles, however desirable it may appear to do so in order to get at the facts.

From Wales large lots of rails continue to be sent to America, Dowlais having sent 3000 tons to New York and New Orleans; Tredegar to New Orleans; Aberdare to Russia; and Dowlais also to Russia. The total exports from Cardiff for the week are, coal, 42,000 tons; coke, 650 tons; patent fuel, 1300 tons; rails, 5300 tons; plates 9 tons and 180 tons, and the imports comprise six cargoes of English ore, one Spanish, one French, and one Portuguese. A good business is doing in general hardware at Birmingham and Wolverhampton, most of the miscellaneous trades being in receipt of good orders. The general condition of the iron trades may, I think (in concluding this notice of it), be summed up in a few words. If the labor market remains untroubled, and prices be not too rashly put up to too high a figure, 1873 will bear favorable comparison with 1872. On the other hand, if speculation or other causes forces up prices too rapidly and too far, trade will again collapse, not to revive again for some years.

In copper fair transactions have transpired at figures much the same as last week. Good soft English pig lead is to be had at £21. 15/ to £22, market being firm. Silesian spelter realizes £23. 7/6 to £24, and V. & B. English, £24; during the year the average has been £22. Stocks of spelter are now somewhat reduced. Quicksilver fetches about £12. 10/ to £13 per bottle. In tin rather more has been stirring. Straits having changed hands at £136. 10/ for cash, and £135. 10/ prompt, December 31st. At the beginning of March Straits realized £142, reaching its highest point, £153, during May. Tin plates are in considerable demand chiefly for America, the Continent, India and Australia, the provision trade in the latter colony having materially improved the demand, for this article. I. C. coke is worth 33/ to 36/, and I. C. charcoal 34/ to 40/. Sheet zinc has advanced £2 or so during the year, and is now quoted £31 to £32. 10/.

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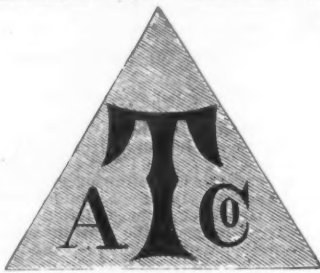
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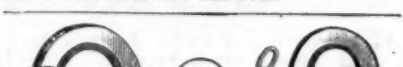
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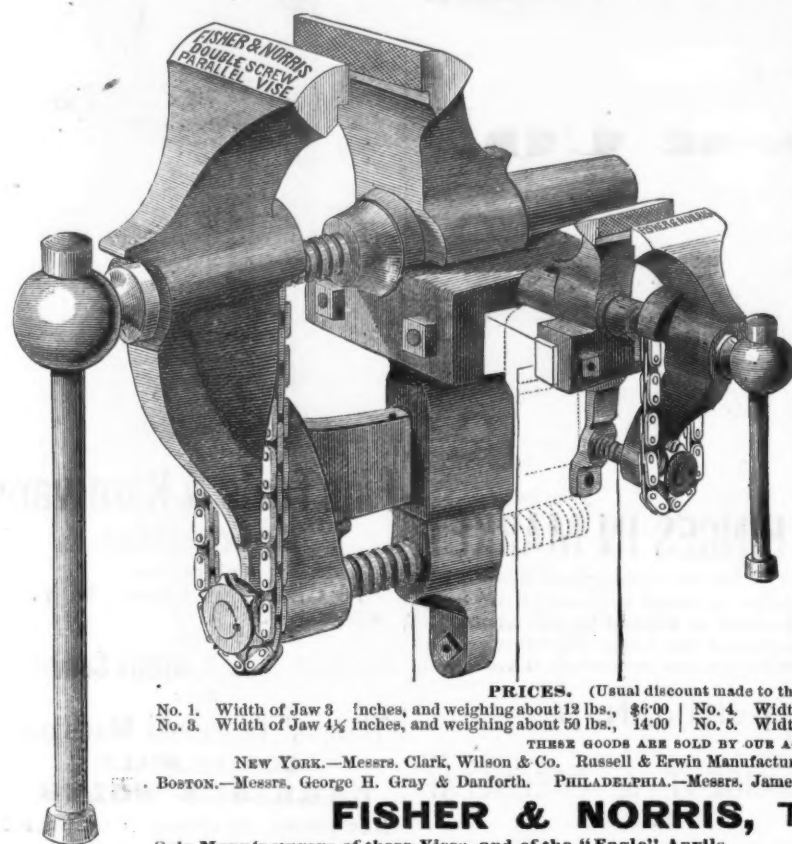
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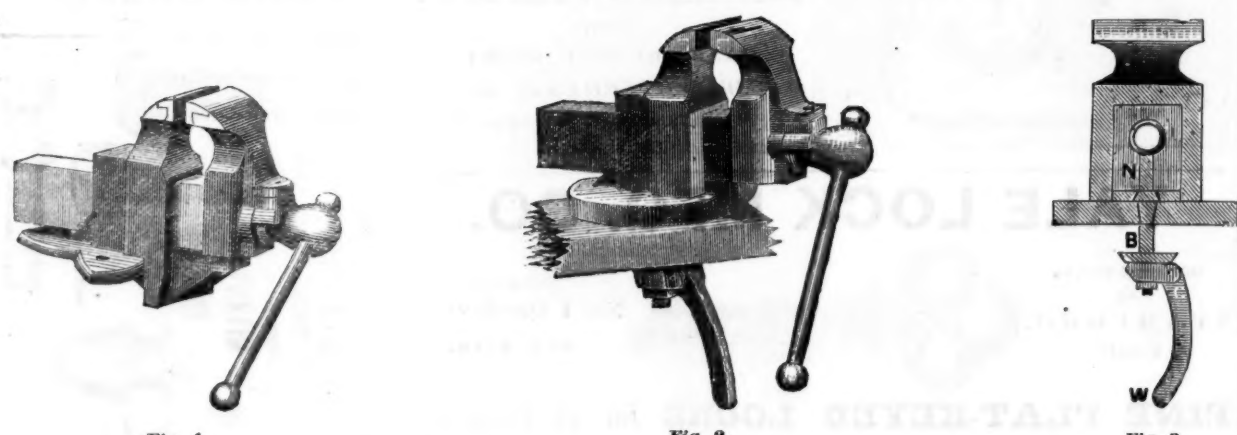


Fig. 1.

Fig. 2.

Fig. 3.

These Vises having been thoroughly tested during the past three years, and proving superior to any other Bench Vise yet produced, they are offered to the trade on liberal terms. An examination of the improvements is particularly desired.

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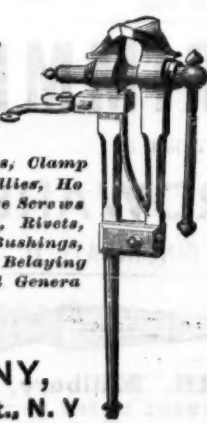
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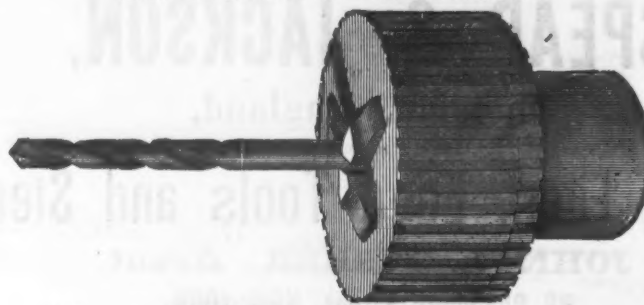
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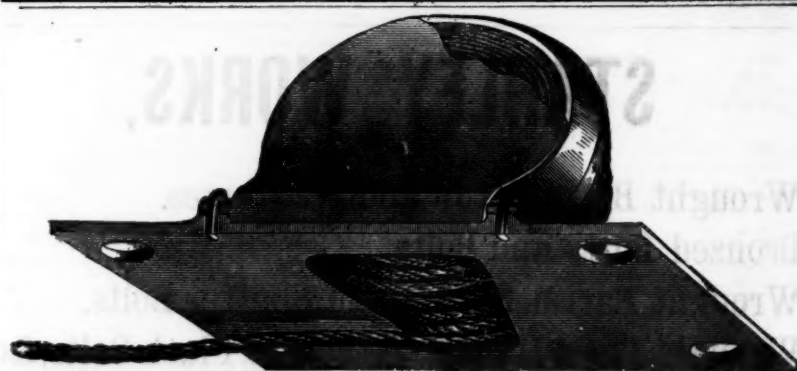


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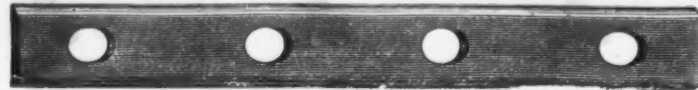
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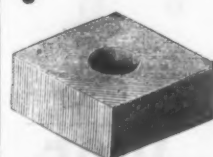
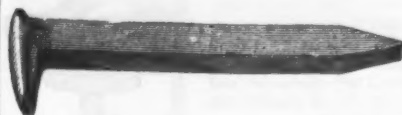
a cut of which is annexed. They have been in use for more than ten years
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 being of the best brass wire is not liable to rust or break, and is full
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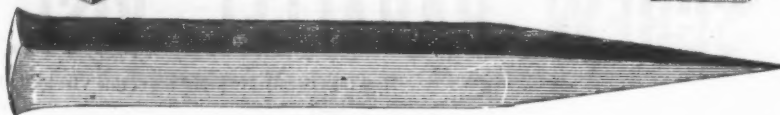
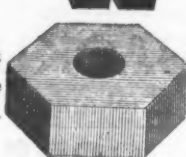
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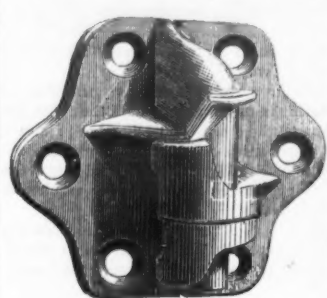
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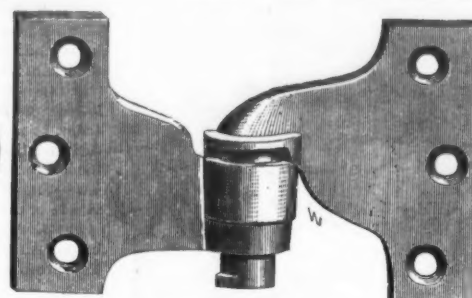
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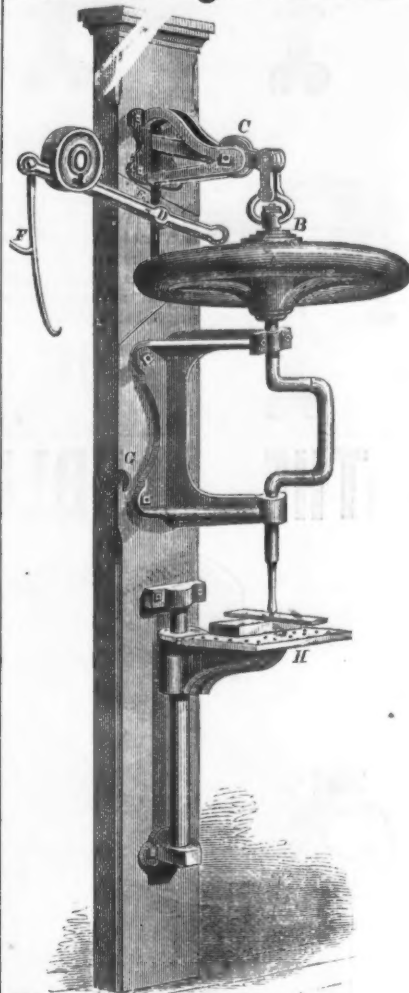
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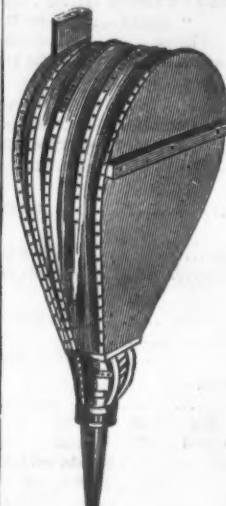
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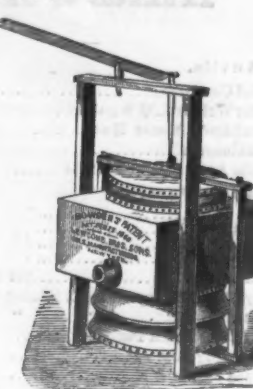


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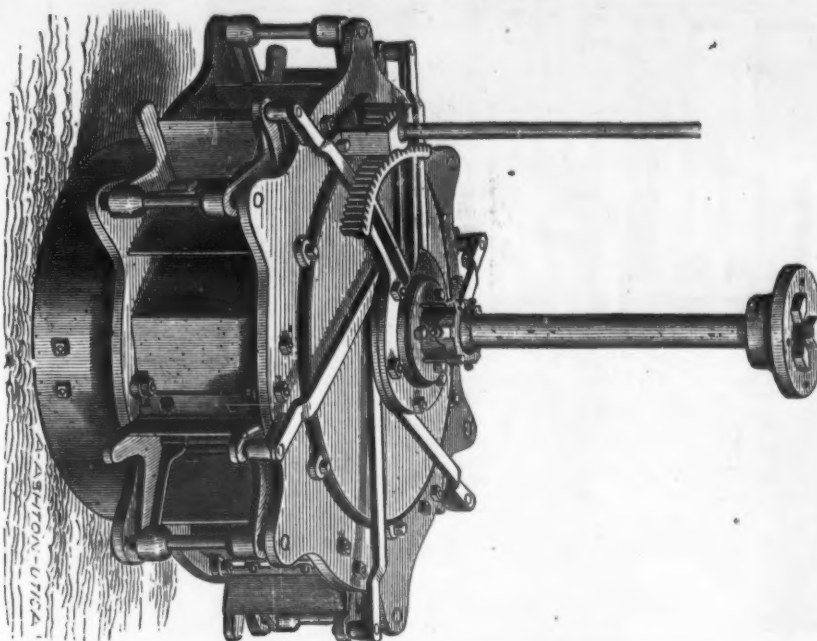
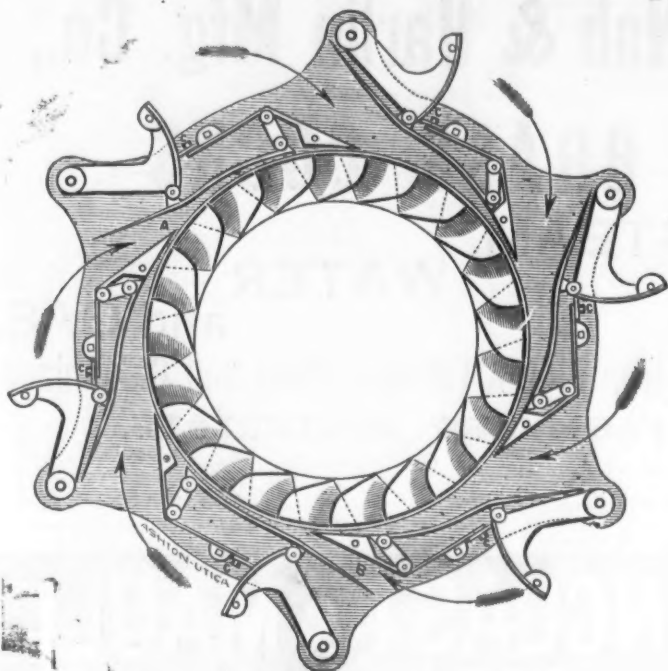
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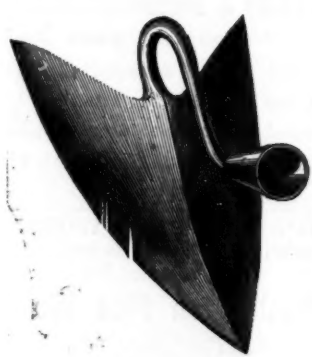
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For Goshen and Middletown, 7:30, 8:00, 10:30, 11:00 and 11:15 A. M., 3:30, 4:30, 5:30, 7:30 and 7:00 P. M.
For Warwick, 8:00, 11:00 and 11:15 A. M., 4:30 P. M.
For Newburgh, 8:00, 10:30, 9:00 and 11:00 A. M., 3:30, 4:30 and 5:30 P. M.

For Suffern, 7:20, 8:00, 10:30, 11:00 and 11:15 A. M., 3:30, 5:00, 7:30, 7:00 and 11:30 P. M.
For Ridgewood, Hoboken, Alendale, and Ramsey's, 7:30, 8:00, 10:30, 11:00, 11:15 A. M., 3:30, 5:00, 7:30, 7:00 and 11:30 P. M.
For Patterson, 6:45, 7:30, 8:00, 10:30, 11:00, 11:15 A. M., 12:00, 3:30, 4:00, 5:00, 5:15, 5:30, 6:00, 6:30, 7:00, 8:00, 10:00 and 11:30 P. M.

For Rutherford Park and Passaic, 6:45, 7:30, 10:00, 11:00 A. M., 12:00, 3:30, 4:00, 5:15, 6:00, 6:30, 8:00, 10:30 and 11:30 P. M.

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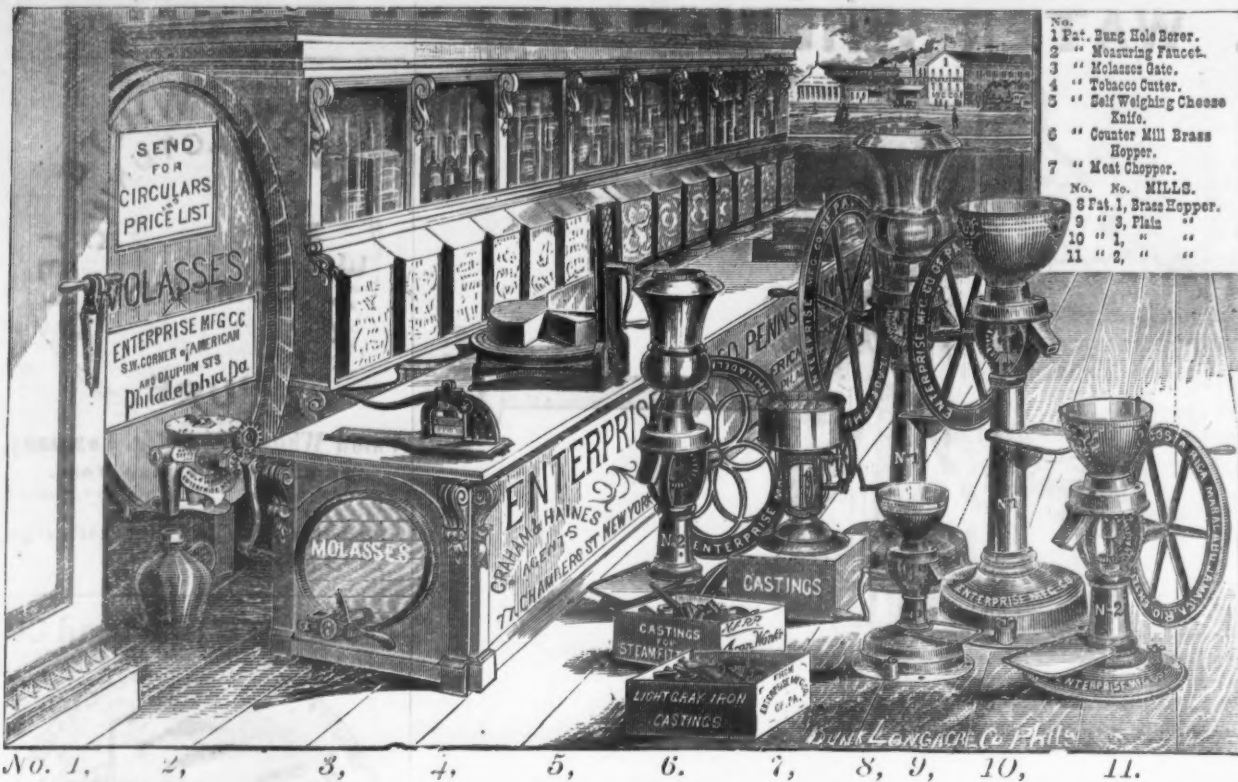


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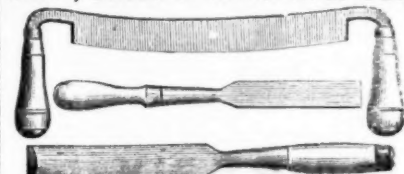
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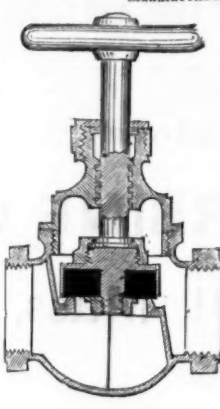
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Steam, Gas and Water,

PLAIN AND GALVANIZED

WROUGHT IRON PIPE,

Nos. 62 & 64 Gold Street,
NEW YORK.

Business Established, 1836. Incorporated, 1872.

Industrial Tube Works.

ISAAC J. GRIFFITHS & BROS.

Manufacturers of

Wrought Iron & Galvanized Tubes

For Gas, Steam and Water.

Brass and Iron Valves, Cocks,

Cast and Malleable Iron Fittings.

Tubes cut and fitted to plans and specifications.

1529, 1531, 1533 & 1535 South 7th St.,

PHILADELPHIA.

WASHINGTON PIPE WORKS,

Office, No. 8 Central Street.

Boston, January 17, 1872.

The Washington Pipe Works

are now in full operation, and I take this method of in-
forming my friends and the public that I am now pre-
pared to fill all orders for the different sizes of

STEAM & GAS PIPE & FITTINGS

Of the best quality and at the lowest market rates.

THOMAS CUNNINGHAM.

Address, Box 3042.

WM. S. CARR & CO.

Sole Manufacturers of

Carr's Patent Plumbers' Goods,

Pumps, Water Closets, Fountains,

Vases, &c.

OFFICE AND WAREHOUSES,

108, 105 & 110 Centre Street,

Factory, Mott Haven, New York.

ROBBINS' PATENT PIPE WRENCH.



Specially designed for large Pipe and heavy work,
and for that use is the best universal wrench in mar-
ket.

Manufactured by

RICE, ROBBINS & CO.,

Pittsfield, Mass.

PHILADELPHIA.

(Corrected weekly by Loya, Supple & Walton.)

Terms, 30 days. For 60 or 90 days interest added at 10 per cent. per annum.

ANVILS.
Solid Cast Steel..... \$12 00
Peter Wright's..... \$12 00
Wilkinson's..... \$12 00
Bagley, \$11 cents, currency..... \$11 00

APPLE PARERS.
Reading..... per doz \$8 50
Turn Table..... per doz \$8 00
Union..... per doz \$8 00

AXES.
Mann's..... light \$14 00, dia 10 1/2
Hunt's, Light..... 15 00, dia 5 1/2
Red Indian, all sizes..... net \$14 00
Red Chieftan..... net 14 75

AUGERS AND BITS.
Bates' Manufacturing Co.'s Bits..... dia 30 @ 20 1/2
Douglas'..... dia 20 @ 25 1/2
Lives'..... dia 20 @ 20 1/2
Bonney's Pat. Hollow Augers..... dia 25 1/2
Bates' Mfg. Co. Augers..... dia 20 @ 20 1/2
Lives'..... dia 20 @ 20 1/2
Douglas'..... dia 20 @ 25 1/2
Cook's Patent Bits..... dia 25 @ 25 1/2
Russell Jennings' Bits..... dia 10 1/2

BALANCES.
Landers, Frary & Clark's..... dia 10 @ 15 1/2
Chattillon's..... dia 10 @ 15 1/2
Morton's..... dia 10 @ 15 1/2
Common Spring, with Hook..... per doz \$1 35 @ 2 00

BELLS.
Bever Bros. Mfg. Co. Hand Bells..... dia 50
Other makers, light..... dia 50
Cone's Door Bells..... dia 50
Western and Kentucky..... dia 50

BORING MACHINES.
Bates' Mfg. Co. complete with augers..... dia 10 @ 15 1/2
Douglas'..... dia 10 @ 15 1/2
Common No. Augers..... \$4 25 @ 4 00
Angular, Extra, No. Augers..... 5 50 @ 5 00

BOLTS.
Eastern Carriage Bolts..... dia 50 @ 15 1/2
Western..... dia 50 @ 15 1/2
Philadelphia Carriage Bolts..... dia 45 @ 45 1/2
Wrought Shutter Bolts..... dia 35 @ 10
Cast..... dia 35

BRACES.
Barber's..... dia 30 @ 10 1/2
Bartholomew's..... dia 10 @ 15 1/2
Spofford..... dia 35 @ 37 1/2

Cast Fast Joint, Narrow.....
Broad.....
Cast Loose Joint.....
Acorn Drilled.....
Wrought Loose Pin.....
Wrought Table.....
Narrow.....
Loose Joint.....

CLAMPING.
Parker's Blind Butts..... dia 25 1/2
Shepherd's..... dia 30
Clark's..... dia 30
Lull & Porter's do..... dia 25 @ 25 1/2
Palmer's do..... dia 30 @ 30 1/2

CHAINS.
German Halter..... new gold list net
Coll..... new gold list net
Galvanized Pump..... dia 15
English Coll, less than cash..... add 1/2 c. per lb.
Common Chain..... 1/2 c. per lb.
Best Proof, by the case, 500 lbs.; less than cash add 1/2 c.

CHISELS.
Socket Framing..... dia 60 @ 60 1/2
Socket Firmer..... dia 60 @ 60 1/2
Tang Firmer..... dia 40 @ 40 1/2
Beatty's Framing and Firmer..... dia 10 @ 10 1/2

CASTER.
Porcelain Wheel..... dia 30 @ 10 1/2
Iron..... dia 30 @ 10 1/2
Brass..... dia 10

CLOTHES WRINGERS.
Reliance advanced March 7..... per doz \$72 00
Crown..... 72 00
Monitor..... 72 00
Universal..... 72 00
Novelty..... 72 00
In 5 dozen lots assorted, at one time \$70 00 per doz.

CUTLERY.
Common Box and Side advanced April 1872..... dia 15 1/2
Patent..... dia 10
American Pocket (best)..... dia 30 @ 25 1/2
Landers, Frary & Clark, J. Russell & Co., dia 15 1/2
Lamson & Goodnow Mfg. Co., dia 15 1/2

DRAWING KNIVES.
Hart Mfg. Co.'s..... dia 60 @ 60 1/2
Concave Adjustable Handle..... dia 10
Beatty's..... dia 10

FLUENT MACHINES.
Nicholson Mill Files..... new list, \$5 00 to 2 c. cur
Bastard..... 5 00 to 2 c. cur
Taper..... 5 00 to 2 c. cur
Butcher's Mill..... Unsettled
Bastard..... Unsettled
Taper..... Unsettled

FLUTING MACHINES.
Royal, No. 1, 4 1/2 inch Rollers..... list \$6 00
No. 2, 6 inch Rollers..... list 7 00

HAMMERS AND HATCHETS.
Yerkes & Plumb's..... dia 5 @ 10 1/2
Hammond & Son's..... dia 5 @ 10 1/2

HINGES.
Strap and T..... list net
Bonney's Gate..... dia 20

HORSE NAILS.
Nos. 6 7 8 9 10
Ausable Horse Nails..... 27 25 24 23 22
Globe..... 29 25 24 23
Putnam..... 30 28 27 26 25
Brundage..... 34 23 22 21
On Ausable Globe & Brundage 1000 lb lots..... dia 5

KNIVES.
Door (regular manufacture)..... dia 25 1/2
Porcelain and Mineral..... dia 25 1/2

LANDERS, FRARY & CLARK'S.
Rim and Mortise..... dia 25 1/2
Till and Cupboard..... dia 30 @ 25 1/2
American Padlocks..... dia 40
Trunk Locks..... dia 5 @ 10 1/2
Thumb and Roggens..... net @ dia 10

MATTOKES.
Long and Short Cut..... dia 10 1/2
Western Pattern..... dia 10 1/2
Pennsylvania Pattern..... dia 10 1/2

MEASURING FAUCETS.
Enterprise Mfg. Co.'s Measuring Faucets..... dia 20
Stebbins' Gages..... dia 40 @ 10 1/2
Landers, Frary & Clark's, Petroleum dia 10 @ 10 1/2
Taylor's Petroleum Faucets..... dia 30 @ 30 1/2

MEAT CUTTERS.
Stow Mfg. Co. Meat Cutters, new list..... dia 5
Dixon..... dia 5
Hale..... dia 5
Stow Mfg. Co. Stuffers..... dia 5

MILLS.
Stanley Rule and Level Co..... dia 30 @ 10 1/2
Stevens and Hubbard's..... dia 30 @ 10 1/2

SCREW DRIVERS.
Steel Squares, advanced August 1st..... list net
Iron..... list net

SAWS.
Disston's Hand, Mill and Circular..... dia 12 1/2
Wm. McClenahan's Hand, Cross-Cut and Circular, new list..... dia 10
Boydton's Lightning, new list..... dia 30

SHOVELS AND SPADES.
Rowland's Plain Back, advanced Apr. 1872..... dia 5 1/2
Back Strap..... dia 5 1/2
Oliver Ames & Sons, advanced April 8..... net list
Brady Shovel Co..... dia 7 1/2

SHOVELS.
Reading (planned face)..... per lb. 6c.
Coanock (polished face)..... 5c.

STOVE POLISH.
Gem..... per gross \$5 00
Onyx..... \$5 00

SAFE LOCKS.
Clark's Patent..... dia 20
Ferguson..... dia 20
Bonney's..... dia 25 1/2

Clout and Finishing Nails.....
by the case..... dia 7 1/2
Genuine Oneida-Newhouse list..... dia 15 1/2
Imitation..... dia 30

COES GENUINE.....
Coes Imitation Wrought Bar..... dia 30
Coes Imitation Malleable Bar..... dia 40
Tafts Wrought Bar..... dia 40
Tafts Malleable Bar..... dia 50

WIRE.
No. 0 to 18..... dia 15
No. 19 to 20..... dia 27 1/2 @ 30
No. 21 to 30..... dia 33 1/2 @ 35
Coppered 0 to 18..... dia 15 @ 30
Thinned Broom Wire..... dia 10 @ 15
Bradley & Co., Office Nos. 19 & 21 South Fourth st., Philadelphia. Price list of Proved and Warranted Chains. Discount 1/2 c. per lb.

SHORT LINK CHAIN.
Size. Average Wt. Proof. Price
Inches. Per Fathom. Tons. Per Cts.
1/2 to 6 by 1/2 to 1 inch..... 4 1/2
3/4 to 6 by 3/4 to 1 inch..... 4 1/2
1 to 6 by 1 to 1 1/2 inch..... 5 1/2
1 1/2 to 6 by 1 1/2 to 2 inch..... 6 1/2
2 to 6 by 2 to 2 1/2 inch..... 7 1/2
2 1/2 to 6 by 2 1/2 to 3 inch..... 8 1/2
3 to 6 by 3 to 3 1/2 inch..... 9 1/2
3 1/2 to 6 by 3 1/2 to 4 inch..... 10 1/2
4 to 6 by 4 to 4 1/2 inch..... 11 1/2
4 1/2 to 6 by 4 1/2 to 5 inch..... 12 1/2
5 to 6 by 5 to 5 1/2 inch..... 13 1/2
5 1/2 to 6 by 5 1/2 to 6 inch..... 14 1/2
6 to 6 by 6 to 6 1/2 inch..... 15 1/2
6 1/2 to 6 by 6 1/2 to 7 inch..... 16 1/2
7 to 6 by 7 to 7 1/2 inch..... 17 1/2
7 1/2 to 6 by 7 1/2 to 8 inch..... 18 1/2
8 to 6 by 8 to 8 1/2 inch..... 19 1/2
8 1/2 to 6 by 8 1/2 to 9 inch..... 20 1/2
9 to 6 by 9 to 9 1/2 inch..... 21 1/2
9 1/2 to 6 by 9 1/2 to 10 inch..... 22 1/2
10 to 6 by 10 to 10 1/2 inch..... 23 1/2
10 1/2 to 6 by 10 1/2 to 11 inch..... 24 1/2
11 to 6 by 11 to 11 1/2 inch..... 25 1/2
11 1/2 to 6 by 11 1/2 to 12 inch..... 26 1/2
12 to 6 by 12 to 12 1/2 inch..... 27 1/2
12 1/2 to 6 by 12 1/2 to 13 inch..... 28 1/2
13 to 6 by 13 to 13 1/2 inch..... 29 1/2
13 1/2 to 6 by 13 1/2 to 14 inch..... 30 1/2
14 to 6 by 14 to 14 1/2 inch..... 31 1/2
14 1/2 to 6 by 14 1/2 to 15 inch..... 32 1/2
15 to 6 by 15 to 15 1/2 inch..... 33 1/2
15 1/2 to 6 by 15 1/2 to 16 inch..... 34 1/2
16 to 6 by 16 to 16 1/2 inch..... 35 1/2
16 1/2 to 6 by 16 1/2 to 17 inch..... 36 1/2
17 to 6 by 17 to 17 1/2 inch..... 37 1/2
17 1/2 to 6 by 17 1/2 to 18 inch..... 38 1/2
18 to 6 by 18 to 18 1/2 inch..... 39 1/2
18 1/2 to 6 by 18 1/2 to 19 inch..... 40 1/2
19 to 6 by 19 to 19 1/2 inch..... 41 1/2
19 1/2 to 6 by 19 1/2 to 20 inch..... 42 1/2
20 to 6 by 20 to 20 1/2 inch..... 43 1/2
20 1/2 to 6 by 20 1/2 to 21 inch..... 44 1/2
21 to 6 by 21 to 21 1/2 inch..... 45 1/2
21 1/2 to 6 by 21 1/2 to 22 inch..... 46 1/2
22 to 6 by 22 to 22 1/2 inch..... 47 1/2
22 1/2 to 6 by 22 1/2 to 23 inch..... 48 1/2
23 to 6 by 23 to 23 1/2 inch..... 49 1/2
23 1/2 to 6 by 23 1/2 to 24 inch..... 50 1/2
24 to 6 by 24 to 24 1/2 inch..... 51 1/2
24 1/2 to 6 by 24 1/2 to 25 inch..... 52 1/2
25 to 6 by 25 to 25 1/2 inch..... 53 1/2
25 1/2 to 6 by 25 1/2 to 26 inch..... 54 1/2
26 to 6 by 26 to 26 1/2 inch..... 55 1/2
26 1/2 to 6 by 26 1/2 to 27 inch..... 56 1/2
27 to 6 by 27 to 27 1/2 inch..... 57 1/2
27 1/2 to 6 by 27 1/2 to 28 inch..... 58 1/2
28 to 6 by 28 to 28 1/2 inch..... 59 1/2
28 1/2 to 6 by 28 1/2 to 29 inch..... 60 1/2
29 to 6 by 29 to 29 1/2 inch..... 61 1/2
29 1/2 to 6 by 29 1/2 to 30 inch..... 62 1/2
30 to 6 by 30 to 30 1/2 inch..... 63 1/2
30 1/2 to 6 by 30 1/2 to 31 inch..... 64 1/2
31 to 6 by 31 to 31 1/2 inch..... 65 1/2
31 1/2 to 6 by 31 1/2 to 32 inch..... 66 1/2
32 to 6 by 32 to 32 1/2 inch..... 67 1/2
32 1/2 to 6 by 32 1/2 to 33 inch..... 68 1/2
33 to 6 by 33 to 33 1/2 inch..... 69 1/2
33 1/2 to 6 by 33 1/2 to 34 inch..... 70 1/2
34 to 6 by 34 to 34 1/2 inch..... 71 1/2
34 1/2 to 6 by 34 1/2 to 35 inch..... 72 1/2
35 to 6 by 35 to 35 1/2 inch..... 73 1/2
35 1/2 to 6 by 35 1/2 to 36 inch..... 74 1/2
36 to 6 by 36 to 36 1/2 inch..... 75 1/2
36 1/2 to 6 by 36 1/2 to 37 inch..... 76 1/2
37 to 6 by 37 to 37 1/2 inch..... 77 1/2
37 1/2 to 6 by 37 1/2 to 38 inch..... 78 1/2
38 to 6 by 38 to 38 1/2 inch..... 79 1/2
38 1/2 to 6 by 38 1/2 to 39 inch..... 80 1/2
39 to 6 by 39 to 39 1/2 inch..... 81 1/2
39 1/2 to 6 by 39 1/2 to 40 inch..... 82 1/2
40 to 6 by 40 to 40 1/2 inch..... 83 1/2
40 1/2 to 6 by 40 1/2 to 41 inch..... 84 1/2
41 to 6 by 41 to 41 1/2 inch..... 85 1/2
41 1/2 to 6 by 41 1/2 to 42 inch..... 86 1/2
42 to 6 by 42 to 42 1/2 inch..... 87 1/2
42 1/2 to 6 by 42 1/2 to 43 inch..... 88 1/2
43 to 6 by 43 to 43 1/2 inch..... 89 1/2
43 1/2 to 6 by 43 1/2 to 44 inch..... 90 1/2
44 to 6 by 44 to 44 1/2 inch..... 91 1/2
44 1/2 to 6 by 44 1/2 to 45 inch..... 92 1/2
45 to 6 by 45 to 45 1/2 inch..... 93 1/2
45 1/2 to 6 by 45 1/2 to 46 inch..... 94 1/2
46 to 6 by 46 to 46 1/2 inch..... 95 1/2
46 1/2 to 6 by 46 1/2 to 47 inch..... 96 1/2
47 to 6 by 47 to 47 1/2 inch..... 97 1/2
47 1/2 to 6 by 47 1/2 to 48 inch..... 98 1/2
48 to 6 by 48 to 48 1/2 inch..... 99 1/2
48 1/2 to 6 by 48 1/2 to 49 inch..... 100 1/2
49 to 6 by 49 to 49 1/2 inch..... 101 1/2
49 1/2 to 6 by 49 1/2 to 50 inch..... 102 1/2
50 to 6 by 50 to 50 1/2 inch..... 103 1/2
50 1/2 to 6 by 50 1/2 to 51 inch..... 104 1/2
51 to 6 by 51 to 51 1/2 inch..... 105 1/2
51 1/2 to 6 by 51 1/2 to 52 inch..... 106 1/2
52 to 6 by 52 to 52 1/2 inch..... 107 1/2
52 1/2 to 6 by 52 1/2 to 53 inch..... 108 1/2
53 to 6 by 53 to 53 1/2 inch..... 109 1/2
53 1/2 to 6 by 53 1/2 to 54 inch..... 110 1/2
54 to 6 by 54 to 54 1/2 inch..... 111 1/2
54 1/2 to 6 by 54 1/2 to 55 inch..... 112 1/2
55 to 6 by 55 to 55 1/2 inch..... 113 1/2
55 1/2 to 6 by 55 1/2 to 56 inch..... 114 1/2
56 to 6 by 56 to 56 1/2 inch..... 115 1/2
56 1/2 to 6 by 56 1/2 to 57 inch..... 116 1/2
57 to 6 by 57 to 57 1/2 inch..... 117 1/2
57 1/2 to 6 by 57 1/2 to 58 inch..... 118 1/2
58 to 6 by 58 to 58 1/2 inch..... 119 1/2
58 1/2 to 6 by 58 1/2 to 59 inch..... 120 1/2
59 to 6 by 59 to 59 1/2 inch..... 121 1/2
59 1/2 to 6 by 59 1/2 to 60 inch..... 122 1/2
60 to 6 by 60 to 60 1/2 inch..... 123 1/2
60 1/2 to 6 by 60 1/2 to 61 inch..... 124 1/2
61 to 6 by 61 to 61 1/2 inch..... 125 1/2
61 1/2 to 6 by 61 1/2 to 62 inch..... 126 1/2
62 to 6 by 62 to 62 1/2 inch..... 127 1/2
62 1/2 to 6 by 62 1/2 to 63 inch..... 128 1/2
63 to 6 by 63 to 63 1/2 inch..... 129 1/2
63 1/2 to 6 by 63 1/2 to 64 inch..... 130 1/2
64 to 6 by 64 to 64 1/2 inch..... 131 1/2
64 1/2 to 6 by 64 1/2 to 65 inch..... 132 1/2
65 to 6 by 65 to 65 1/2 inch..... 133 1/2
65 1/2 to 6 by 65 1/2 to 66 inch..... 134 1/2
66 to 6 by 66 to 66 1/2 inch..... 135 1/2
66 1/2 to 6 by 66 1/2 to 67 inch..... 136 1/2
67 to 6 by 67 to 67 1/2 inch..... 137 1/2
67 1/2 to 6 by 67 1/2 to 68 inch..... 138 1/2
68 to 6 by 68 to 68 1/2 inch..... 139 1/2
68 1/2 to 6 by 68 1/2 to 69 inch..... 140 1/2
69 to 6 by 69 to 69 1/2 inch..... 141 1/2
69 1/2 to 6 by 69 1/2 to 70 inch..... 142 1/2
70 to 6 by 70 to 70 1/2 inch..... 143 1/2
70 1/2 to 6 by 70 1/2 to 71 inch..... 144 1/2
71 to 6 by 71 to 71 1/2 inch..... 145 1/2
71 1/2 to 6 by 71 1/2 to 72 inch..... 146 1/2
72 to 6 by 72 to 72 1/2 inch..... 147 1/2
72 1/2 to 6 by 72 1/2 to 73 inch..... 148 1/2
73 to 6 by 73 to 73 1/2 inch..... 149 1/2
73 1/2 to 6 by 73 1/2 to 74 inch..... 150 1/2
74 to 6 by 74 to 74 1/2 inch..... 151 1/2
74 1/2 to 6 by 74 1/2 to 75 inch..... 152 1/2
75 to 6 by 75 to 75 1/2 inch..... 153 1/2
75 1/2 to 6 by 75 1/2 to 76 inch..... 154 1/2
76 to 6 by 76 to 76 1/2 inch..... 155 1/2
76 1/2 to 6 by 76 1/2 to 77 inch..... 156 1/2
77 to 6 by 77 to 77 1/2 inch..... 157 1/2
77 1/2 to 6 by 77 1/2 to 78 inch..... 158 1/2
78 to 6 by 78 to 78 1/2 inch..... 159 1/2
78 1/2 to 6 by 78 1/2 to 79 inch..... 160 1/2
79 to 6 by 79 to 79 1/2 inch..... 161 1/2
79 1/2 to 6 by 79 1/2 to 80 inch..... 162 1/2
80 to 6 by 80 to 80 1/2 inch..... 163 1/2
80 1/2 to 6 by 80 1/2 to 81 inch..... 164 1/2
81 to 6 by 81 to 81 1/2 inch..... 165 1/2
81 1/2 to 6 by 81 1/2 to 82 inch..... 166 1/2
82 to 6 by 82 to 82 1/2 inch..... 167 1/2
82 1/2 to 6 by 82 1/2 to 83 inch..... 168 1/2
83 to 6 by 83 to 83 1/2 inch..... 169 1/2
83 1/2 to 6 by 83 1/2 to 84 inch..... 170 1/2
84 to 6 by 84 to 84 1/2 inch..... 171 1/2
84 1/2 to 6 by 84 1/2 to 85 inch..... 172 1/2
85 to 6 by 85 to 85 1/2 inch..... 173 1/2
85 1/2 to 6 by 85 1/2 to 86 inch..... 174 1/2
86 to 6 by 86 to 86 1/2 inch..... 175 1/2
86 1/2 to 6 by 86 1/2 to 87 inch..... 176 1/2
87 to 6 by 87 to 87 1/2 inch..... 177 1/2
87 1/2 to 6 by 87 1/2 to 88 inch..... 178 1/2
88 to 6 by 88 to 88 1/2 inch..... 179 1/2
88 1/2 to 6 by 88 1/2 to 89 inch..... 180 1/2
89 to 6 by 89 to 89 1/2 inch..... 181 1/2
89 1/2 to 6 by 89 1/2 to 90 inch..... 182 1/2
90 to 6 by 90 to 90 1/2 inch..... 183 1/2
90 1/2 to 6 by 90 1/2 to 91 inch..... 184 1/2
91 to 6 by 91 to 91 1/2 inch..... 185 1/2
91 1/2 to 6 by 91 1/2 to 92 inch..... 186 1/2
92 to 6 by 92 to 92 1/2 inch..... 187 1/2
92 1/2 to 6 by 92 1/2 to 93 inch..... 188 1/2
93 to 6 by 93 to 93 1/2 inch..... 189 1/2
93 1/2 to 6 by 93 1/2 to 94 inch..... 190 1/2
94 to 6 by 94 to 94 1/2 inch..... 191 1/2
94 1/2 to 6 by 94 1/2 to 95 inch..... 192 1/2
95 to 6 by 95 to 95 1/2 inch..... 193 1/2
95 1/2 to 6 by 95 1/2 to 96 inch..... 194 1/2
96 to 6 by 96 to 96 1/2 inch..... 195 1/2
96 1/2 to 6 by 96 1/2 to 97 inch..... 196 1/2
97 to 6 by 97 to 97 1/2 inch..... 197 1/2
97 1/2 to 6 by 97 1/2 to 98 inch..... 198 1/2
98 to 6 by 98 to 98 1/2 inch..... 199 1/2
98 1/2 to 6 by 98 1/2 to 99 inch..... 200 1/2
99 to 6 by 99 to 99 1/2 inch..... 201 1/2
99 1/2 to 6 by 99 1/2 to 100 inch..... 202 1/2
100 to 6 by 100 to 100 1/2 inch..... 203 1/2
100 1/2 to 6 by 100 1/2 to 101 inch..... 204 1/2
101 to 6 by 101 to 101 1/2 inch..... 205 1/2
101 1/2 to 6 by 101 1/2 to 102 inch..... 206 1/2
102 to 6 by 102 to 102 1/2 inch..... 207 1/2
102 1/2 to 6 by 102 1/2 to 103 inch..... 208 1/2
103 to 6 by 103 to 103 1/2 inch..... 209 1/2
103 1/2 to 6 by 103 1/2 to 104 inch..... 210 1/2
104 to 6 by 104 to 104 1/2 inch..... 211 1/2
104 1/2 to 6 by 104 1/2 to 105 inch..... 212 1/2
105 to 6 by 105 to 105 1/2 inch..... 213 1/2
105 1/2 to 6 by 105 1/2 to 106 inch..... 214 1/2
106 to 6 by 106 to 106 1/2 inch..... 215 1/2
106 1/2 to 6 by 106 1/2 to 107 inch..... 216 1/2
107 to 6 by 107 to 107 1/2 inch..... 217 1/2
107 1/2 to 6 by 107 1/2 to 108 inch..... 218 1/2
108 to 6 by 108 to 108 1/2 inch..... 219 1/2
108 1/2 to 6 by 108 1/2 to 109 inch..... 220 1/2
109 to 6 by 109 to 109 1/2 inch..... 221 1/2
109 1/2 to 6 by 109 1/2 to 110 inch..... 222 1/2
110 to 6 by 110 to 110 1/2 inch..... 223 1/2
110 1/2 to 6 by 110 1/2 to 111 inch..... 224 1/2
111 to 6 by 111 to 111 1/2 inch..... 225 1/2
111 1/2 to 6 by 111 1/2 to 112 inch..... 226 1/2
112 to 6 by 112 to 112 1/2 inch..... 227 1/2
112 1/2 to 6 by 112 1/2 to 113 inch..... 228 1/2
113 to 6 by 113 to 113 1/2 inch..... 229 1/2
113 1/2 to 6 by 113 1/2 to 114 inch..... 230 1/2
114 to 6 by 114 to 114 1/2 inch..... 231 1/2
114 1/2 to 6 by 114 1/2 to 115 inch..... 232 1/2
115 to 6 by 115 to 115 1/2 inch..... 233 1/2
115 1/2 to 6 by 115 1/2 to 116 inch..... 234 1/2
116 to 6 by 116 to 116 1/2 inch..... 235 1/2
116 1/2 to 6 by 116 1/2 to 117 inch..... 236 1/2
117 to 6 by 117 to 117 1/2 inch..... 237 1/2
117 1/2 to 6 by 117 1/2 to 118 inch..... 238 1/2
118 to 6 by 118 to 118 1/2 inch..... 239 1/2
118 1/2 to 6 by 118 1/2 to 119 inch..... 240 1/2
119 to 6 by 119 to 119 1/2 inch..... 241 1/2
119 1/2 to 6 by 119 1/2 to 120 inch..... 242 1/2
120 to 6 by 120 to 120 1/2 inch..... 243 1/2
120 1/2 to 6 by 120 1/2 to 121 inch..... 244 1/2
121 to 6 by 121 to 121 1/2 inch..... 245 1/2
121 1/2 to 6 by 121 1/2 to 122 inch..... 246 1/2
122 to 6 by 122 to 122 1/2 inch..... 247 1/2
122 1/2 to 6 by 122 1/2 to 123 inch..... 248 1/2
123 to 6 by 123 to 123 1/2 inch..... 249 1/2
123 1/2 to 6 by 123 1/2 to 124 inch..... 250 1/2
124 to 6 by 124 to 124 1/2 inch..... 251 1/2
124 1/2 to 6 by 124 1/2 to 125 inch..... 252 1/2
125 to 6 by 125 to 125 1/2 inch..... 253 1/2
125 1/2 to 6 by 125 1/2 to 126 inch..... 254 1/2
126 to 6 by 126 to 126 1/2 inch..... 255 1/2
126 1/2 to 6 by 126 1/2 to 127 inch..... 256 1/2
127 to 6 by 127 to 127 1/2 inch..... 257 1/2
127 1/2 to 6 by 127 1/2 to 128 inch..... 258 1/2
128 to 6 by 128 to 128 1/2 inch..... 259 1/2
128 1/2 to 6 by 128 1/2 to 129 inch..... 260 1/2
129 to 6 by 1

Steel.

THREE
1st CLASS PRIZE MEDALS.
CLASSES 1, 21, 22,
Great Exhibition of Industry,
LONDON, 1861.

MEDAL OF HONOUR,
SOCIETY OF ARTS & INDUSTRY,
LONDON, 1856.

1st CLASS
PRIZE MEDAL, CLASS 1st
UNIVERSAL
EXHIBITION OF INDUSTRY
PARIS, 1855.

COCKER BROTHERS,
SUCCESSORS TO
SAM'L COCKER & SON,
(Established 1752.)
SHEFFIELD, ENGLAND

MANUFACTURERS OF
CAST, SHEAR, SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, GRINDING, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

ALSO

GENERAL MERCHANTS.
Agent, JONATHAN HATTERSLEY, Cincinnati, Ohio

WM. JESSOP & SONS,
MANUFACTURERS OF
STEEL,
AND IMPORTERS OF IRON,
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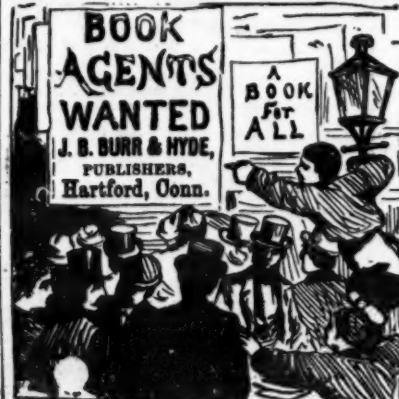
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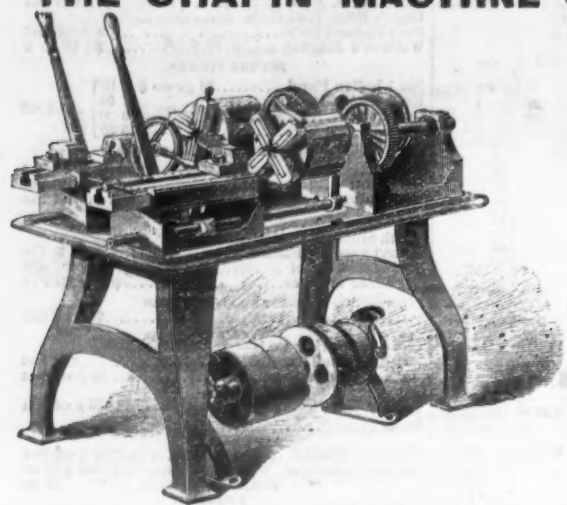
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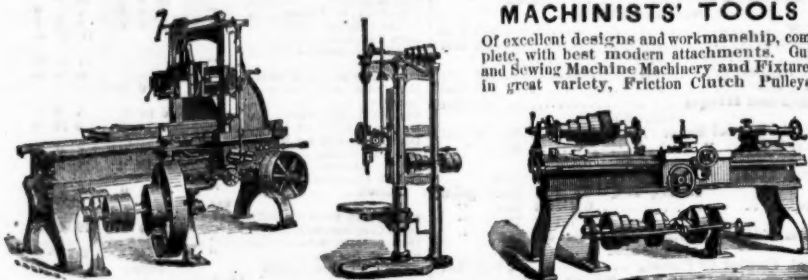
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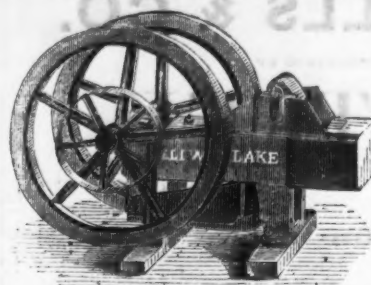
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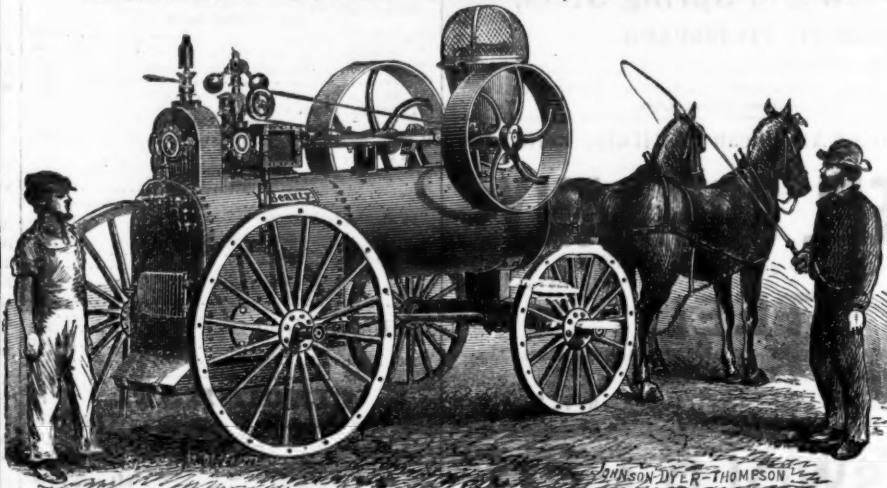
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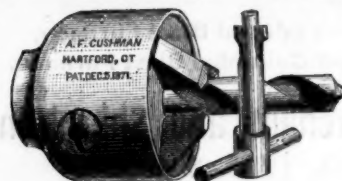
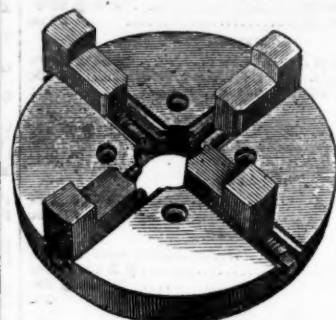
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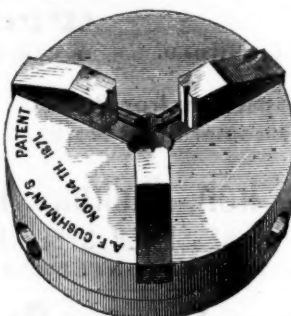
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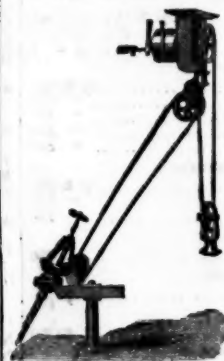
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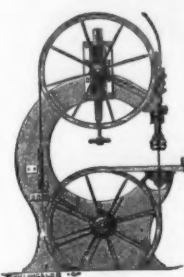
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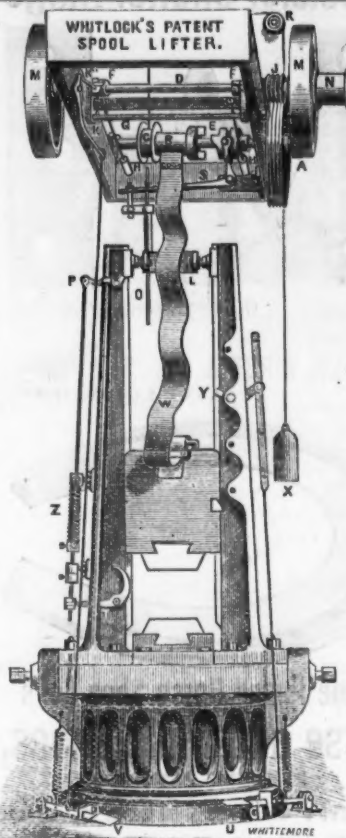
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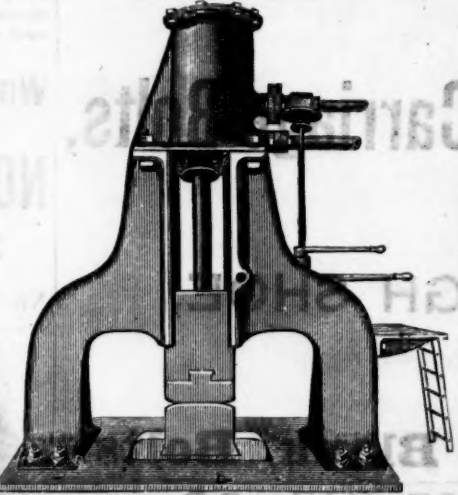
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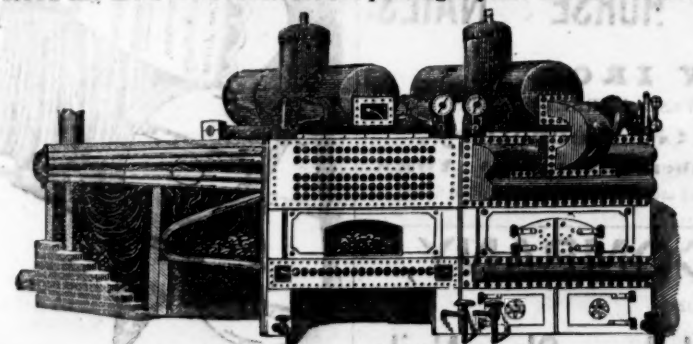
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